K. R. (KEN) WELCH
Assistant Vice President
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Room 930
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UNION PACIFIC RAILROAD COMPANY

R. L. (RICK) EADES
Director Environmental Field Operations
W.E. (BILL) ROE
Director Track Maintenance – Safety

Directors Environmental Field Operations
B. A. (BROCK) NELSON – Northern Region
L. A. (LANNY) SCHMID – Western Region
G. (GLENN) THOMAS – Southern Region

Environmental Protection
Omaha, NE

January 7, 2000

Mr. Kenneth V. Herstowski, P.E.
USEPA
RCRA Corrective Action & Permits Branch
Air, RCRA and Toxics Division
901 North 5th Street
Kansas City, KS 66101

Dear Mr. Herstowski:

Please refer to the Proposed Administrative Order on Consent (the Order) for the Omaha, Nebraska Shops of the Union Pacific Railroad Company. More specifically, the site is described as 9th and Cass Streets, Omaha, Nebraska, RCRA I.D. No. NED000829754. During discussions between EPA and Union Pacific regarding the site, the concept of separating the site into operable units was devised. It was further agreed that work under the Order could proceed with the initial unit, which is Operable Unit 1. Operable Unit 1 is that portion of the site the City of Omaha will initially purchase from Union Pacific and develop.

The Union Pacific is endeavoring to maintain its schedule for investigation and remediation of the site to accommodate the City of Omaha's plans for development. In order to satisfy the schedule Union Pacific has developed, the Union Pacific wishes to furnish EPA with three copies of the draft Corrective Measures Study (CMS) for OU1 for review at this time. This document is dated December 1999. Please review the draft CMS and furnish me with your comments at your earliest convenience. One additional copy of the draft CMS is being transmitted to you for forwarding to the RCRA Section of the Nebraska Department of Environmental Quality (NDEQ). The Railroad's understanding

is that EPA will forward all documents to NDEQ for their review and request they provide EPA with comments.

In order to prepare the Omaha Shops site for development in a timely and cost-effective manner, the Union Pacific wishes to obtain the approval of EPA for completing Interim Measures at three locations in the Omaha Shops. The first location of work is located in OU1 near the westerly portion of the site. The work at this location encompasses removing and disposing of asbestos contaminated soil. The next two locations of work are located in OU2. The second location of work is SWMU 14, which is the Paint Barrel Pits. The proposed work includes excavating contaminated soils and disposing of them. The third location of work is SWMU 20, which is the Acetylene Sludge Pits. At this location, we propose to excavate contaminated soils and remediate them. Our desire is to coordinate the work contemplated in the three Interim Measures with work we propose to complete for petroleum contamination in the southern portion of the site. The petroleum contamination work encompasses removing hydrocarbon contaminated soil and incinerating it on-site and also removing free product from groundwater while the excavation is open. Approval for this work is being sought from the NDEQ.

To assist you in reviewing our request to conduct the three Interim Measures noted above, I have included for your use three copies each of the following documents.

1. Planning Memorandum - Asbestos Area Interim Measures, January 3, 2000.

2. Planning Memorandum - Paint Barrel Pits Interim Measures, January 3, 2000 (SWMU 14).

3. Planning Memorandum - Acetylene Sludge Pits Interim Measures, January 3, 2000 (SWMU 20).

The goal of Union Pacific is to conduct the Interim Measures work in April 2000. We truly appreciate your effort in reviewing our request so that the schedule may be maintained. If you wish to call me to discuss any aspect of the work please contact me at (402) 271-3675.

Yours truly,

Jeffrey D. McDermott

Jeffrey D. McDermott, P.E.
Mgr. Environmental Site Remediation

ENC

C: Theodore L. Huscher - NDEQ (W/ENC)
Norman Jackman - City of Omaha (W/ENC)
C. Dale Jacobson - Jacobson Helgoth (W/ENC)
Denny Brown - UPRR
Jeff Smith - URSGWC

DRAFT REPORT

CORRECTIVE MEASURES STUDY OPERABLE UNIT NO. 1 (OU1)

Omaha Shops

Prepared for
Union Pacific Railroad Company
Omaha, Nebraska

UNION PACIFIC

ENVIRONMENTAL MANAGEMENT

December 1999

URS Greiner Woodward Clyde

101 South 108th Avenue
Omaha, Nebraska 68154

SUBJECT: **Asbestos Area Interim Measures**

DATE: January 3, 2000

PROJECT: Omaha Shops RCRA Facility Investigation
Union Pacific Railroad Company
Omaha, Nebraska

This planning memorandum has been prepared for the Union Pacific Railroad Company (UPRR) by URS Greiner Woodward Clyde (URSGWC). The memorandum summarizes interim measures (IM) activities planned for the Asbestos Area located at the Omaha Shop facility. The Omaha Shops facility is located north of downtown Omaha near 9th and Webster Streets as shown on Figure 1. The location of the Asbestos Area is shown on Figure 2.

Field activities described in this memorandum are planned to start on or about April 1, 2000.

Purpose

The purpose of the planned IM activities is to reduce concentrations of potential contaminants in the soil at the referenced site, in anticipation of future development on the Omaha Shops property. The IM work is intended to remove the asbestos contaminated soil. The scope of planned activities is based on the findings of previous site investigations described in the RCRA Facility Investigation Report, Operable Unit No. 1, Omaha Shops, Union Pacific Railroad Company (URSGWC 1999).

Interim Measures Approach

Soil impacted by asbestos will be excavated and disposed, and the excavation backfilled with clean soil. Confirmation samples will be collected following the procedures described below. All field activities will be completed in accordance with the Omaha Shops Health and Safety Plan and Standard Operating Procedures in the Data Collection Quality Assurance Plan. The following actions will be taken as part of the IM for this site.

1. A utility clearance will be completed at each site prior to the start of the IM activities.

2. Field investigation activities will be completed following procedures specified in the Omaha Shops Health and Safety Plan. The fieldwork is expected to be completed using level D personal protective equipment. The Health and Safety Plan will be modified as necessary to address the activities described in this planning memorandum. Particular attention will be paid to safety procedures around heavy equipment.

3. The top 12-inches of soil will be excavated using a backhoe or other heavy equipment. The planned lateral limits of the excavation are based on the analytical results for subsurface soil samples collected in January 1999 (Figure 2).

4. Excavated soil will be loaded into lined trucks for transport to the designated disposal site.

5. Confirmation soil samples will be collected outside the lateral limits of the excavation and analyzed for asbestos. The confirmation sample analytical results will be used to verify that remaining soils do not exceed one percent asbestos.

6. Confirmation soil samples will be collected using a stainless-steel spoon. The sample material will be placed directly into a sample container provided by the laboratory.

7. Sampling equipment will be decontaminated prior to use at each sampling location using an Alconox water wash and clean water rinse.

8. Sample material will be placed in the appropriate container, labeled, packaged, and shipped to EMSL Analytical for asbestos analysis.

9. Sampling locations will be documented in the field logbook and the extent of any excavated areas will be marked and surveyed.

10. Excavated areas will be fenced off and left open following removal of the contaminated material.

11. If confirmation sample results exceed the one percent criteria, continue excavation activities followed by re-collection of confirmation samples outside the newly excavated area. Continue this procedure until all confirmation sample concentrations are below the one percent criteria.

12. Backfill the excavations with "clean" fill soils brought onto the site. The soils will be compacted in the excavations to minimize future settling.

Design Plans and Specifications

Design plans and specifications will be prepared prior to IM implementation. Specifications and/or drawing notes will include, but not be limited to, the following:

1. Before starting excavation activities, submit copies of all permits, licenses, and authorizations including, but not limited to, licenses of waste transporters and waste disposal facilities.
2. Prior to the start of excavation activities, communicate with the Owner and local representatives concerning the location of utilities including, but not limited to, oil, gas, electrical, telephone, communications, water, and sewer. The location and type of utilities that may be present in the area are not completely shown on the Drawings.
3. Install fencing or concrete barricades around excavation areas to prevent unauthorized access before starting excavation. Provide and maintain barricades with warning lights during excavation activities until excavation is backfilled.

4. Take all necessary precautions to assure no damage occurs to existing structures or appurtenances that may be affected by work activities. Any damage resulting from the Contractor's operations shall be repaired at no expense to the Owner.
5. Clear excavation sites of objectionable materials and debris. Designate noncontaminated material not salvaged for reuse on-site as spoiled and dispose of material in accordance with State and local requirements.
6. All excavation sideslopes must conform to safety requirements specified by Federal, State, and local government regulations.
7. Excavation includes removal and subsequent handling of materials excavated or otherwise handled in the performance of the work.
8. Contaminated soil will be loaded into lined dump trucks or roll-offs for transport to the designated disposal site.
9. Transport and dispose of waste in accordance with Federal, State, and local laws and regulations.
10. Contractor shall properly manifest each load of waste materials that is transported off site for disposal.
11. After excavation is complete to design limits, the Engineer will collect soil samples to verify that the performance standards have been achieved. Soil samples will be analyzed for asbestos.
12. The Engineer will direct additional excavation to remove contaminated soil, if necessary, based on results of confirmatory soil testing.
13. Upon notification from Engineer, immediately backfill the excavation(s).
14. Backfill the excavation using clean fill material from an off-site source.
15. Place backfill material into excavations in 6-inch thick (maximum) lifts.
16. Compact backfill as much as practical using heavy equipment.
17. At completion of work at each location, remove equipment, unused materials, temporary facilities, debris, and miscellaneous items resulting from or used during construction. Restore site, as nearly as possible, to original conditions.
18. Submit copies of completed manifests and certificates of disposal indicating quantities of the various wastes and materials accepted for disposal.

Operation and Maintenance Plan

An operation and maintenance plan is not anticipated since the materials will be removed for off-site disposal and the excavation filled with clean material.

Interim Measures Implementation Schedule

The anticipated IM schedule is shown on Figure 3.

TABLE 1

ESTIMATED ASBESTOS AREA SAMPLING BREAKDOWN
UPRR OMAHA SHOPS FACILITY

ANALYTICAL METHOD	PARAMETER	NO. OF FIELD SAMPLES	NO. OF FIELD REPLICATES	NO. OF MS/MSD SAMPLES	TOTAL NO. OF SAMPLES
Soil					
EPA 600/R-93/116 Method	Asbestos	10	1	NA/NA	11

NA = Not Applicable

TABLE 2

SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES UPRR OMAHA SHOPS FACILITY

ANALYTICAL METHOD	PARAMETER	CONTAINERS PER SAMPLE	MINIMUM SAMPLE SIZE	PRESERVATION	HOLDING TIME
Soil					
EPA 600/R-93/116 Method	Asbestos	One Ziploc type 2" x 2" plastic bag	10 grams	None	None

NEBRASKA

QUADRANGLE LOCATION

BASE MAP SOURCE: USGS 7.5 MINUTE SERIES (TOPOGRAPHIC) QUADRANGLE MAP OF OMAHA NORTH, NE.–IA., 1994.

2000 1000 0 2000

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OMAHA SHOPS LOCATION

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY DAP	DATE 12/15/99	PROJECT NO. 45-091MC204.04	FIG. NO. 1
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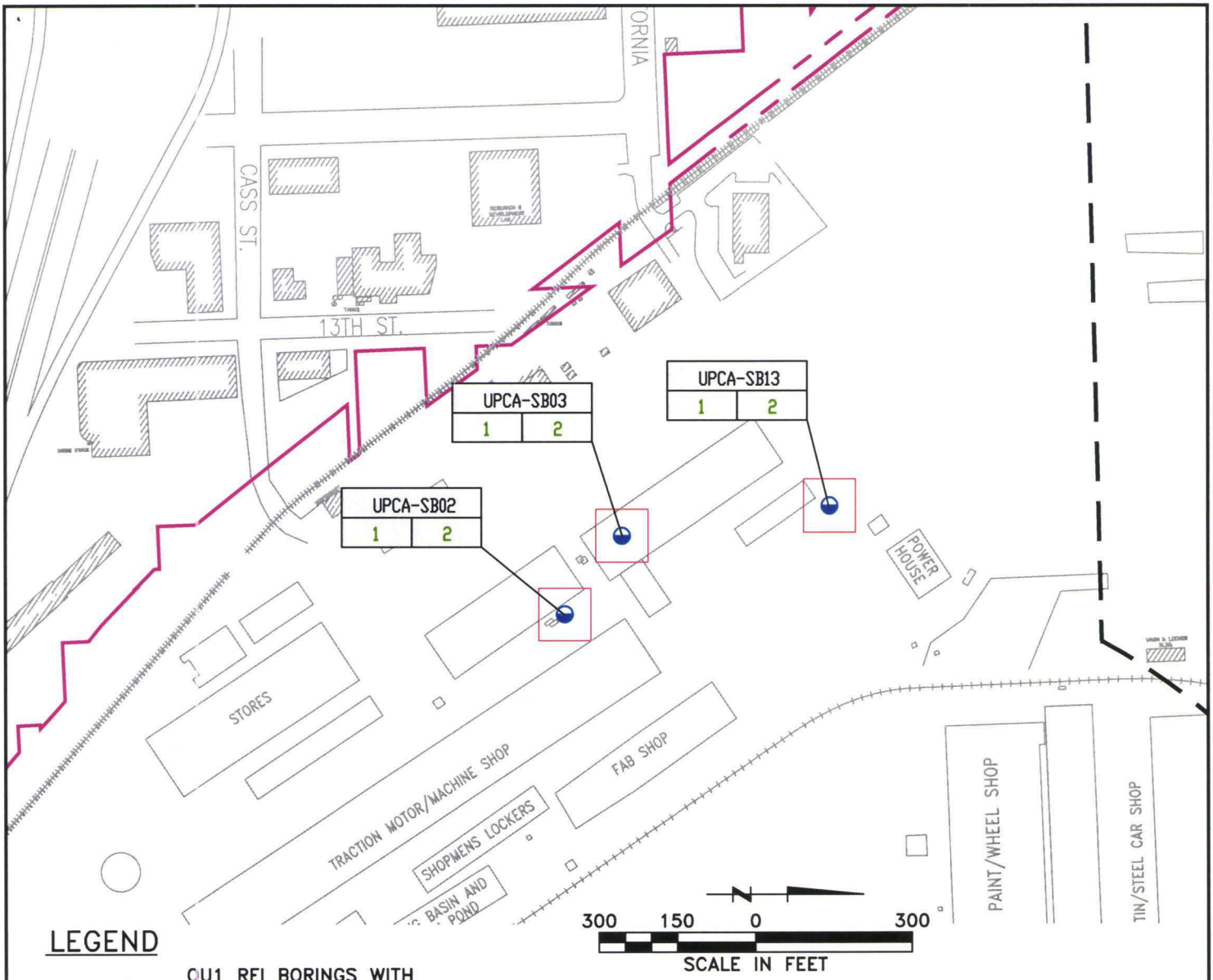


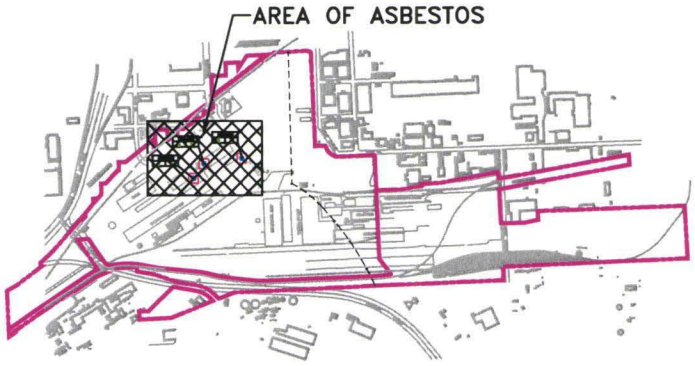
LEGEND

- OU1 RFI BORINGS WITH ASBESTOS DETECTED
- STRUCTURES
- PROPERTY LINE
- OU1 BOUNDARY
- LIMITS OF EXCAVATION

UPCA-SB03 (1 | 2)

- SITE I.D.
- SOIL BORING I.D.
- CA CONSTRUCTION AREA
- CONCENTRATION IN PERCENT
- SAMPLE DEPTH INTERVAL

0 – 1' SURFACE SOIL



KEY MAP

PROPOSED EXCAVATION LIMITS FOR ASBESTOS IN SOIL

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY	TSSM	DATE	10/06/99	PROJECT NO.	FIG. NO.
CHK'D BY	JAW	REVISION	0	45-091MC204.04	2

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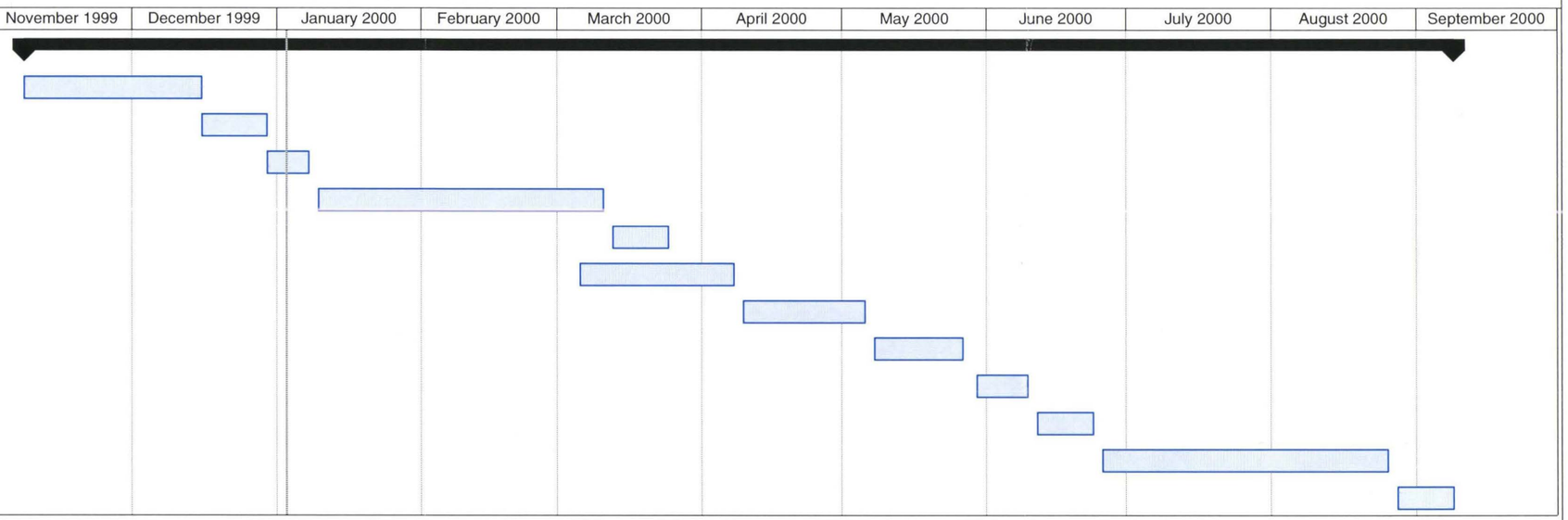
Xrefs: planar property line.DWG DRILLHOLES.DWG uprrpropline.DWG BASE.DWG

FIGURE 3
UPRR OMAHA SHOPS
IM PROJECT SCHEDULE

ID	Task Name	Duration	Start	Finish
1	**Asbestos Removal**	**306 days**	**Mon 11/8/99**	**Fri 9/8/00**
2	Internal Draft Planning Memo	38 days	Mon 11/8/99	Wed 12/15/99
3	UPRR Review	14 days	Thu 12/16/99	Wed 12/29/99
4	DraftPlanning Memorandum	9 days	Thu 12/30/99	Fri 1/7/00
5	EPA Review	61 days	Mon 1/10/00	Fri 3/10/00
6	Final Planning Memorandum	12 days	Mon 3/13/00	Fri 3/24/00
7	Procurement	33 days	Mon 3/6/00	Fri 4/7/00
8	Field Work	26 days	Mon 4/10/00	Fri 5/5/00
9	Internal Draft Report	19 days	Mon 5/8/00	Fri 5/26/00
10	UPRR Review	11 days	Tue 5/30/00	Fri 6/9/00
11	Draft Report	12 days	Mon 6/12/00	Fri 6/23/00
12	EPA Review	61 days	Mon 6/26/00	Fri 8/25/00
13	Final Report	12 days	Mon 8/28/00	Fri 9/8/00



Project: Asbimf3
Date: Mon 1/3/00

Task | Progress | Summary | Rolled Up Split | Rolled Up Progress | Project Summary
Split | Milestone | Rolled Up Task | Rolled Up Milestone | External Tasks

SUBJECT: **Paint Barrel Pits Interim Measures**

DATE: January 3, 2000

PROJECT: Omaha Shops RCRA Facility Investigation
Union Pacific Railroad Company
Omaha, Nebraska

This planning memorandum has been prepared for the Union Pacific Railroad Company (UPRR) by URS Greiner Woodward Clyde (URSGWC). The memorandum summarizes interim measures (IM) activities planned for the Paint Barrel Pits located at the Omaha Shop facility. The Omaha Shops facility is located north of downtown Omaha near 9th and Webster Streets as shown on Figure 1. The location of the Paint Barrel Pits is shown on Figure 2.

Field activities described in this memorandum are planned to start on or about April 1, 2000.

Purpose

The purpose of the planned IM activities is to reduce concentrations of potential contaminants in the soil at the referenced site, in anticipation of future development on the Omaha Shops property. The scope of planned activities includes removing contaminated soils and disposing of them. The proposed IM activities are based on the findings of previous site investigations.

Site Background

The Paint Barrel Pits area was identified from historical facility blueprints in the 1990 Environmental Assessment (HDR 1990). The two Paint Barrel Pits were located in an area measuring 150 feet long by 21 feet wide (Figure 2). Former records described this area as being near the intersection of 12th and Izard Streets. This area has not been used since 1985 (HDR 1990).

A total of six soil borings were completed in the Paint Barrel Pits area during the 1990 Environmental Assessment. The borings were spaced evenly through the apparent center of the old pits, as identified on historical blueprints. An area composite sample was collected for total metals, volatile organic compounds (VOCs), extraction procedure (EP) Toxicity, and semivolatile organic compounds (SVOCs) analyses. VOCs were not detected in the soil. However, numerous SVOCs were present at concentrations exceeding industrial media-specific screening levels (MSSLs) including benzo(a)anthracene (25 mg/kg), chrysene (24 mg/kg), benzo(b)fluoranthene (19 m/kg), and benzo(b)pyrene (20 mg/kg). Antimony and lead were also detected at concentrations of 480 mg/kg and 7,800 mg/kg, respectively, which exceeded industrial MSSLs. The lead EP toxicity concentration was 41 mg/L which exceeds the 5 mg/L standard.

Junk fill, wood, asphalt, wire, brass machine parts, asbestos, cinders, sand, gravel and traces of clay were observed in the borings from the 0 to 5 foot depth interval. Two borings were extended to a depth of 10 feet. Dark gray, silty clay was encountered at 8 feet. A strong creosote odor was noticed at the four boreholes closest to Izard Street with organic vapor analyzer (OVA) readings of 10 to 400 units.

Current Investigation Activities

Three test trenches were excavated and two soil borings were drilled at the Paint Barrel Pits in January 1999. Soil samples were collected for chemical analysis from the trenches and borings. The trenching and sampling activities were completed to collect chemical data and to estimate the horizontal and vertical extent of the pits. Only one trench was sampled for chemical analysis due to sloughing soils preventing collection of representative soil samples. The sloughing problems were attributed to the high water table. COPCs were detected at all of the sample locations. The estimated sizes of the Paint Barrel Pits, based on the trenching and soil borings, are listed below.

- West Pit: 30 feet by 120 feet and about 7 feet deep.
- East Pit: 30 feet by 90 feet and about 7 feet deep.

Interim Measures Approach

Impacted materials will be excavated and disposed, and the excavation backfilled with clean soil. Confirmation soil samples will be collected following the procedures described below. All field activities will be completed in accordance with the Omaha Shops Health and Safety Plan and with the Standard Operating Procedures in the Quality Assurance Project Plan. The following actions will be taken as part of the IM for this site.

1. A utility clearance will be completed at each site prior to the start of the IM activities.
2. Field investigation activities will be completed following procedures specified in the Omaha Shops Health and Safety Plan. The majority of the fieldwork is expected to be completed using level D personal protective equipment. The Health and Safety Plan will be modified as necessary to address the activities described in this planning memorandum. Particular attention will be paid to safety procedures around heavy equipment.
3. The soil/debris material within the pits will be excavated down to native soils (about 6 to 8 feet below ground surface) using a backhoe or other heavy equipment. Excavation activities will then continue about 1-foot into the native soils. The planned lateral limits of the excavation are based on the analytical results for subsurface soil samples collected in January 1999. Figure 2 shows the known extent of the pits. Initial excavation activities will continue until all of the soil/debris material has been removed based on visual observations and soil headspace results.

4. Excavated materials from the Paint Barrel Pits will be loaded and transported to the designated disposal site.

5. Confirmation soil samples will be collected from the sidewalls and bottoms of the excavations and analyzed for TCLP VOC and metals analysis. The confirmation sample analytical results will be used to verify that remaining soils do not exceed TCLP criteria.

6. Confirmation soil samples will be collected from the backhoe bucket using a stainless-steel spoon. The sample material will be placed directly into a laboratory-cleaned sample container.

7. Sampling equipment will be decontaminated prior to use at each sampling location using an Alconox water wash and clean water rinse.

8. Sample material will be placed in the appropriate container, labeled, packaged in a cooler with ice, and shipped to Test America Inc. (formerly NET) for chemical analysis.

9. Sampling locations will be documented in the field logbook and the extent of any excavated areas will be marked and surveyed.

10. Excavated areas will be fenced off and left open following removal of the contaminated material.

11. Compare confirmation soil sample results to TCLP criteria. If results exceed TCLP criteria, continue excavation activities followed by re-collection of confirmation samples in newly excavated area. Continue this procedure until all confirmation sample concentrations are below the TCLP criteria.

12. Backfill the excavations with "clean" fill soils brought onto the site. The soils will be compacted in the excavations to minimize future settling.

Design Plans and Specifications

Design plans and specifications will be prepared prior to IM implementation. Specifications and/or drawing notes will include, but not be limited to, the following:

1. Before starting excavation activities, submit copies of all permits, licenses, and authorizations including, but not limited to, licenses of waste transporters and waste disposal facilities.
2. Prior to the start of excavation activities, communicate with the Owner and local representatives concerning the location of utilities including, but not limited to, oil, gas, electric, telephone, communications, water, and sewer. The location and type of utilities that may be present in the area are not completely shown on the Drawings.

3. Install fencing or concrete barricades around excavation areas to prevent unauthorized access before starting excavation. Provide and maintain barricades with warning lights during excavation activities until excavation is backfilled.
4. Take all necessary precautions to assure no damage occurs to existing structures or appurtenances that may be affected by work activities. Any damage resulting from the Contractor's operations shall be repaired at no expense to the Owner.
5. Clear excavation sites of objectionable materials and debris. Designate noncontaminated material not salvaged for reuse on-site as spoiled and dispose of material in accordance with State and local requirements.
6. All excavation sideslopes must conform to safety requirements specified by Federal, State, and local government regulations.
7. Excavation includes removal and subsequent handling of materials excavated or otherwise handled in the performance of the work.
8. Remove visually contaminated soils. The Engineer will collect soil headspace samples to evaluate potential for soil contamination.
9. Haul contaminated soil material, based on headspace results and visual observations, to the soil storage area and temporarily store on and under plastic sheeting. Contaminated soil will be loaded and transported to the designated disposal site.

   Stockpile non-designated soil near the excavation. Non-designated soil is potentially clean material that must be excavated to reach contaminated soil. The Engineer will collect soil headspace samples to evaluate potential for soil contamination.

   The location of the non-designated soil stockpile must be approved by the Owner and Engineer prior to the start of excavation activities.

10. Transport and dispose of waste in accordance with Federal, State, and local laws and regulations.
11. Contractor shall properly manifest each load of waste material that is transported off site for disposal.
12. After excavation is complete to design limits, the Engineer will collect soil samples to verify that the performance standards have been achieved. Soil samples will be analyzed using rapid-turnaround VOC analysis by Method 8260 and total metals by Method 6010.
13. The Engineer will direct additional excavation to remove contaminated soil, if necessary, based on results of confirmatory soil testing.
14. Upon notification from Engineer, immediately backfill the excavation(s).
15. Backfill the excavation using clean fill material from an off-site source.
16. Place backfill material into excavations in 8-inch (maximum) loose lifts.
17. Compact backfill as much as practical using heavy equipment.

18. At completion of work at each location, remove equipment, unused materials, temporary facilities, debris, and miscellaneous items resulting from or used during construction. Restore site, as nearly as possible, to original conditions.

19. Submit copies of completed manifests and certificates of disposal indicating quantities of the various wastes and materials accepted for disposal.

Operation and Maintenance Plan

An operation and maintenance plan is not anticipated since the materials will be removed for off-site disposal and the excavation filled with clean material.

Interim Measures Implementation Schedule

The anticipated IM schedule is shown on Figure 3.

TABLE 1

ESTIMATED PAINT BARREL PITS SAMPLING BREAKDOWN
UPRR OMAHA SHOPS FACILITY

ANALYTICAL METHOD	PARAMETER	NO. OF FIELD SAMPLES	NO. OF FIELD REPLICATES	NO. OF MS/MSD SAMPLES	TOTAL NO. OF SAMPLES
Soil					
8260	VOC	4	1	1/NA	6
6010/7000 series	Total Metals[1]	4	1	1/NA	6

NA = Not Applicable

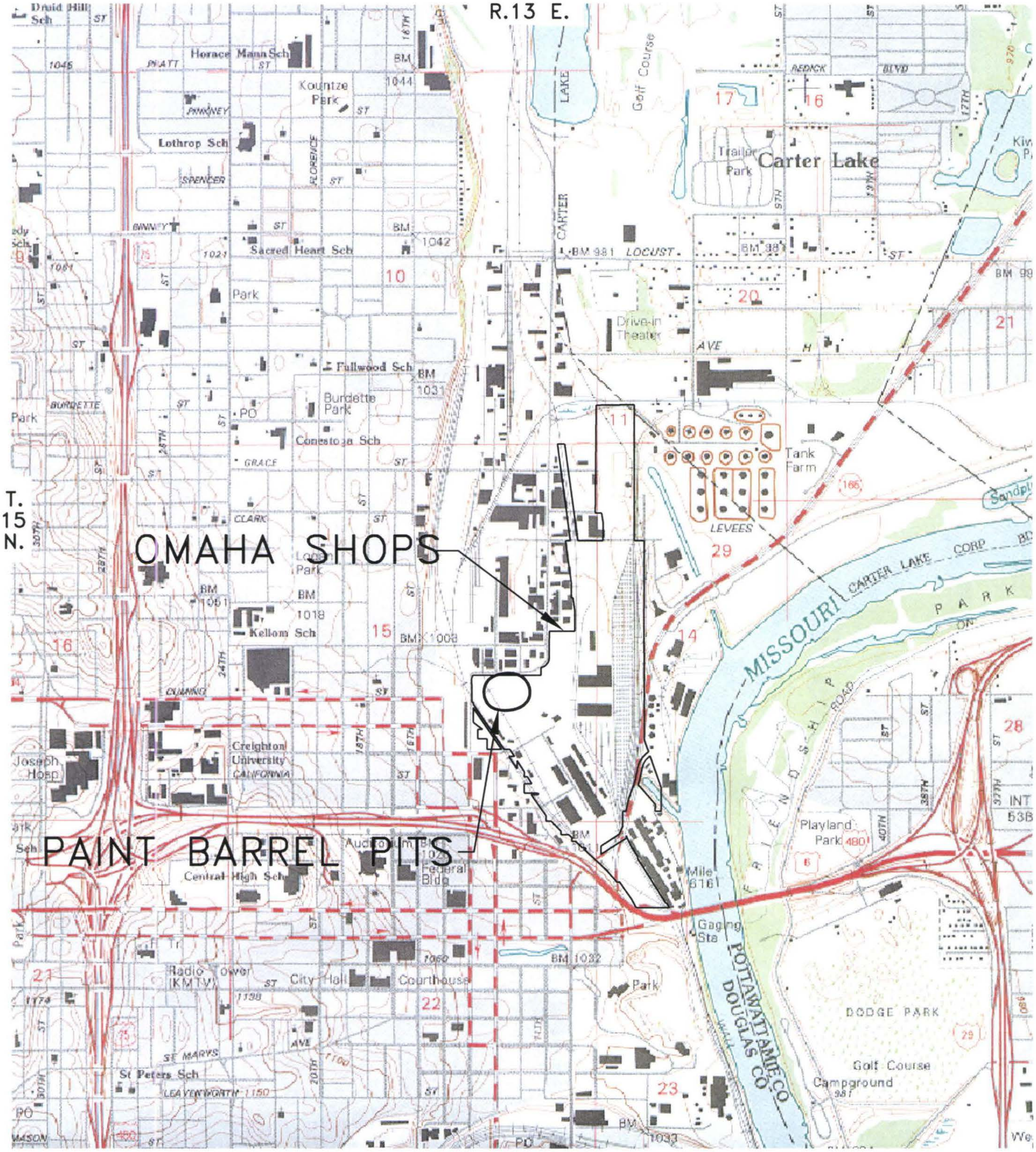
[1]Total metals include analysis of Target Analyte List (TAL) metals. In addition to Method 6010, includes 7060 (arsenic), 7421 (lead), 7740 (selenium), and 7470 (mercury).

TABLE 2

SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES UPRR OMAHA SHOPS FACILITY

ANALYTICAL METHOD	PARAMETER	CONTAINERS PER SAMPLE	MINIMUM SAMPLE SIZE	PRESERVATION	HOLDING TIME
Soil					
8260	VOC	Two 4-oz VOA jars with Teflon-lined lids	10 grams	4° C	14 days
6010/7000 series	Total Metals[1]	One 16-oz widemouth glass jar with Teflon-lined lid	10 grams	4° C	6 months

[1]Total metals include analysis of Target Analyte List (TAL) metals. In addition to Method 6010, includes 7060 (arsenic), 7421 (lead), 7740 (selenium), and 7470 (mercury).



QUADRANGLE LOCATION

BASE MAP SOURCE: USGS 7.5 MINUTE SERIES (TOPOGRAPHIC) QUADRANGLE MAP OF OMAHA NORTH, NE.-IA., 1994.

2000 1000 0 2000

SCALE IN FEET

December 15, 1999 2:46:26 p.m.
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OMAHA SHOPS LOCATION

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY DAP	DATE 12/15/99	PROJECT NO.	FIG. NO.
CHK'D BY .	REVISION .	45-091MC204.04	1

TP-01

SB-01

SB-02

APPROXIMATE LOCATION OF PAINT BARREL PITS

IZARD STREET

12TH STREET

LEGEND

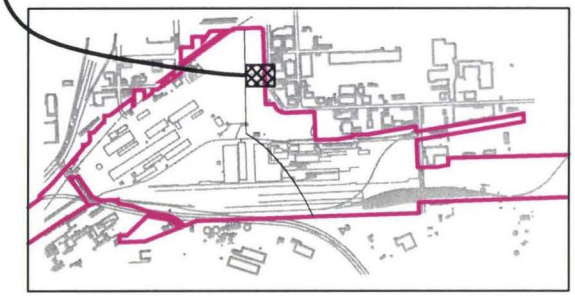
- PREVIOUS TRENCH SOIL SAMPLE LOCATION
- PROPERTY LINE
- PREVIOUS SOIL BORING LOCATION

N

40 20 0 40

SCALE IN FEET

PAINT BARREL PITS AREA



KEY PLAN

SWMU 14–PAINT BARREL PITS SITE PLAN

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

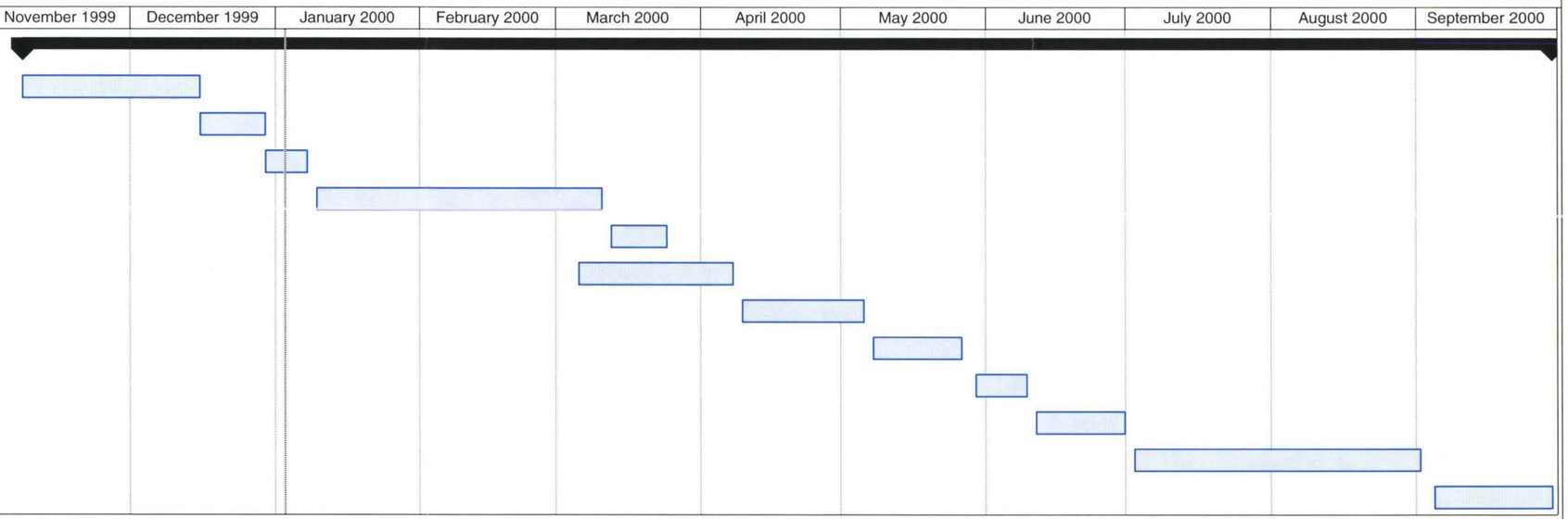
URS Greiner Woodward Clyde

DRN BY DAP	DATE 12/15/99	PROJECT NO.	FIG. NO.
CHK'D BY .	REVISION .	45–091MC204.04	2

November 30, 1999 1:51:53 p.m.
Drawing: T:\91MC204\T01000\F3-1_T1000.DWG (DAP)
Xrefs: uprrpropline.DWG DRILLHOLES.DWG

FIGURE 3
UPRR OMAHA SHOPS
IM PROJECT SCHEDULE

ID	Task Name	Duration	Start	Finish
1	**Paint Barrel Pits**	**327 days**	**Mon 11/8/99**	**Fri 9/29/00**
2	Internal Draft Planning Memo	38 days	Mon 11/8/99	Wed 12/15/99
3	UPRR Review	14 days	Thu 12/16/99	Wed 12/29/99
4	Draft Planning Memorandum	9 days	Thu 12/30/99	Fri 1/7/00
5	EPA Review	61 days	Mon 1/10/00	Fri 3/10/00
6	Final Planning Memorandum	12 days	Mon 3/13/00	Fri 3/24/00
7	Procurement	33 days	Mon 3/6/00	Fri 4/7/00
8	Field Work	26 days	Mon 4/10/00	Fri 5/5/00
9	Internal Draft Report	19 days	Mon 5/8/00	Fri 5/26/00
10	UPRR Review	11 days	Tue 5/30/00	Fri 6/9/00
11	Draft Report	19 days	Mon 6/12/00	Fri 6/30/00
12	EPA Review	61 days	Mon 7/3/00	Fri 9/1/00
13	Final Report	25 days	Tue 9/5/00	Fri 9/29/00



Project: Pbpimf3
Date: Mon 1/3/00

Task | Progress | Summary | Rolled Up Split | Rolled Up Progress | Project Summary
Split | Milestone | Rolled Up Task | Rolled Up Milestone | External Tasks

SUBJECT: **Acetylene Sludge Pits Interim Measures**

DATE: January 3, 2000

PROJECT: Omaha Shops RCRA Facility Investigation
Union Pacific Railroad Company
Omaha, Nebraska

This planning memorandum has been prepared for the Union Pacific Railroad Company (UPRR) by URS Greiner Woodward Clyde (URSGWC). The memorandum summarizes interim measures (IM) activities planned for the Acetylene Sludge Pits located at the Omaha Shop facility. The Omaha Shops facility is located north of downtown Omaha near 9th and Webster Streets as shown on Figure 1. The location of the Acetylene Sludge Pits is shown on Figure 2.

Field activities described in this memorandum are planned to start on or about April 1, 2000.

Purpose

The purpose of the planned IM activities is to reduce concentrations of potential contaminants in the soil at the referenced site, in anticipation of future development on the Omaha Shops property. The scope of planned activities includes removing contaminated soils and disposing of them. The proposed IM activities are based on the findings of previous site investigations.

Site Backgrounds

The North and South Acetylene Sludge Pits are located north of the Grace Street Tank and Pumphouse (AOC 13) at the north end of the Omaha Shops facility. UPRR representatives believe that disposal in the Acetylene Pits was discontinued in 1972. Disposal of a "white substance, possibly a waste product" was identified in a 1941 aerial photograph in the locations now occupied by the North and South Acetylene Sludge Pits. These areas of white material are visible in all subsequent aerial photographs of the site. Historical aerial photographs also show areas of standing liquid on and around the areas of white material. The area is now covered with a fine gray powder. The Acetylene Sludge Pits are surrounded by an earthen berm but are accessible to the public.

Current Investigation Activities

Six test pits were excavated and sampled for chemical analysis in January 1999. Three test pits were dug in each of the two sludge pits. The purpose of the trenching and soil sampling activities was to collect chemical data and to estimate the horizontal and vertical extent of the pits. The estimated sizes of the Acetylene Sludge Pits, based on the test pits, are listed below:

- North Pit: 130 feet by 170 feet and about 6 feet deep.
- South Pit: 90 feet by 110 feet and about 8 feet deep.

Interim Measures Approach

Impacted materials will be excavated, treated on site using soil incineration technology, and replaced in the site excavation. Confirmation soil samples will be collected following the procedures described below. All field activities will be completed in accordance with the Omaha Shops Health and Safety Plan and with the Standard Operating Procedures in the Quality Assurance Project Plan. The following actions will be taken as part of the IM for this site.

1. A utility clearance will be completed at each site prior to the start of the IM activities.

2. The soil incineration unit will be brought to the site and assembled for use.

3. Field activities will be completed following procedures specified in the Omaha Shops Health and Safety Plan. It is anticipated that the majority of the fieldwork will be done using level D personal protective equipment. The Health and Safety Plan will be modified as necessary to address the activities described in this planning memorandum. Particular attention will be paid to safety procedures for work around heavy equipment.

4. The sludge material within the pits will be excavated down to native soils (about 6 to 8 feet below ground surface) using a backhoe or other heavy equipment. Excavation activities will then continue about 1-foot into the native soils. The planned lateral limits of the excavation are based on the analytical results for subsurface soil samples collected in January 1999. Figure 2 shows the known extent of the pits. Initial excavation activities will continue until all of the sludge material has been removed based on visual observations and soil headspace results.

5. Excavated sludge from the Acetylene Sludge Pits will be transported to a staging area and temporarily stored on and covered with plastic until treated by incineration.

6. Confirmation soil samples will be collected from the sidewalls and bottoms of the excavations and analyzed for TCLP VOCs. The confirmation sample analytical results will be used to verify that remaining soils do not exceed the TCLP VOC criteria.

7. Confirmation soil samples will be collected from the backhoe bucket using a stainless-steel spoon. The sample material will be placed directly into a laboratory-cleaned sample container.

8. Sampling equipment will be decontaminated prior to use at each sampling location using an Alconox water wash and clean water rinse.

9. Sample material will be placed in the appropriate container, labeled, packaged in a cooler with ice, and shipped to Test America Inc. (formerly NET) for chemical analysis.

10. Sampling locations will be documented in the field logbook and the extent of any excavated areas will be marked and surveyed.

11. Excavated areas will be fenced off and left open following removal of the contaminated sludge.

12. Compare confirmation soil sample results to TCLP VOC criteria. If results exceed TCLP VOC criteria, continue excavation activities followed by re-collection of confirmation samples in newly excavated area. Continue this procedure until all confirmation sample concentrations are below the TCLP VOC criteria.

13. Treated (incinerated) soil material will be used to backfill the Acetylene Sludge Pits. The soils will be compacted in the excavations to minimize future settling.

Design Plans and Specifications

Design plans and specifications will be prepared prior to IM implementation. Specifications and/or drawing notes will include, but not be limited to, the following:

1. Before starting excavation activities, submit copies of all permits, licenses, and authorizations including, but not limited to, licenses of waste transporters and waste disposal facilities.
2. Prior to the start of excavation activities, communicate with the Owner and local representatives concerning the location of utilities including, but not limited to, oil, gas, electric, telephone, communications, water, and sewer. The location and type of utilities that may be present in the area are not completely shown on the Drawings.
3. Install fencing or concrete barricades around excavation areas to prevent unauthorized access before starting excavation. Provide and maintain barricades with warning lights during excavation activities until excavation is backfilled.
4. Take all necessary precautions to assure no damage occurs to existing structures or appurtenances that may be affected by work activities. Any damage resulting from the Contractor's operations shall be repaired at no expense to the Owner.
5. Clear excavation sites of objectionable materials and debris. Designate noncontaminated material not salvaged for reuse on-site as spoiled and dispose of material in accordance with State and local requirements.
6. All excavation sideslopes must conform to safety requirements specified by Federal, State, and local government regulations.
7. Excavation includes removal and subsequent handling of materials excavated or otherwise handled in the performance of the work.

8. Remove visually contaminated soils. The Engineer will collect soil headspace samples to evaluate potential for soil contamination.
9. Haul contaminated soil material to the soil processing area and temporarily store on and under plastic sheeting. Designated soils from the Acetylene Sludge Pits will be treated in an incinerator.

   Stockpile non-designated soil near the excavation. Non-designated soil is potentially clean material that must be excavated to reach contaminated soil. The Engineer will collect soil headspace samples to evaluate potential for soil contamination.

   The location of the non-designated soil stockpile must be approved by the Owner and Engineer prior to the start of excavation activities.

10. Transport and dispose of waste in accordance with Federal, State, and local laws and regulations.
11. Incinerator Contractor will treat excavated material to concentrations defined in the issued permit(s).
12. After excavation is complete to design limits, the Engineer will collect soil samples to verify that the treated soils are below Universal Treatment Standards. Soil samples will be analyzed using rapid-turnaround VOC analysis by Method 8260.
13. The Engineer will direct additional excavation to remove contaminated soil, if necessary, based on results of confirmatory soil testing from the excavation bottom and sidewalls.
14. Upon notification from Engineer, immediately backfill the excavation(s).
15. Backfill the excavation using treated (incinerated) soil and stockpiled non-designated soil. The treated (incinerated) backfill will not be ready for use until treatment has been completed.
16. Place backfill material into excavations in 8-inch (maximum) loose lifts.
17. Compact backfill as much as practical using heavy equipment.
18. At completion of work at each location, remove equipment, unused materials, temporary facilities, debris, and miscellaneous items resulting from or used during construction. Restore site, as nearly as possible, to original conditions.
19. Submit copies of completed manifests and certificates of disposal indicating quantities of the various wastes and materials accepted for disposal.

Operation and Maintenance Plan

An operation and maintenance plan is not anticipated since the materials will be treated (incinerated) on-site and replaced in the excavation.

Interim Measures Implementation Schedule

The anticipated IM schedule is shown on Figure 3.

TABLE 1

ESTIMATED ACETYLENE SLUDGE PITS SAMPLING BREAKDOWN UPRR OMAHA SHOPS FACILITY

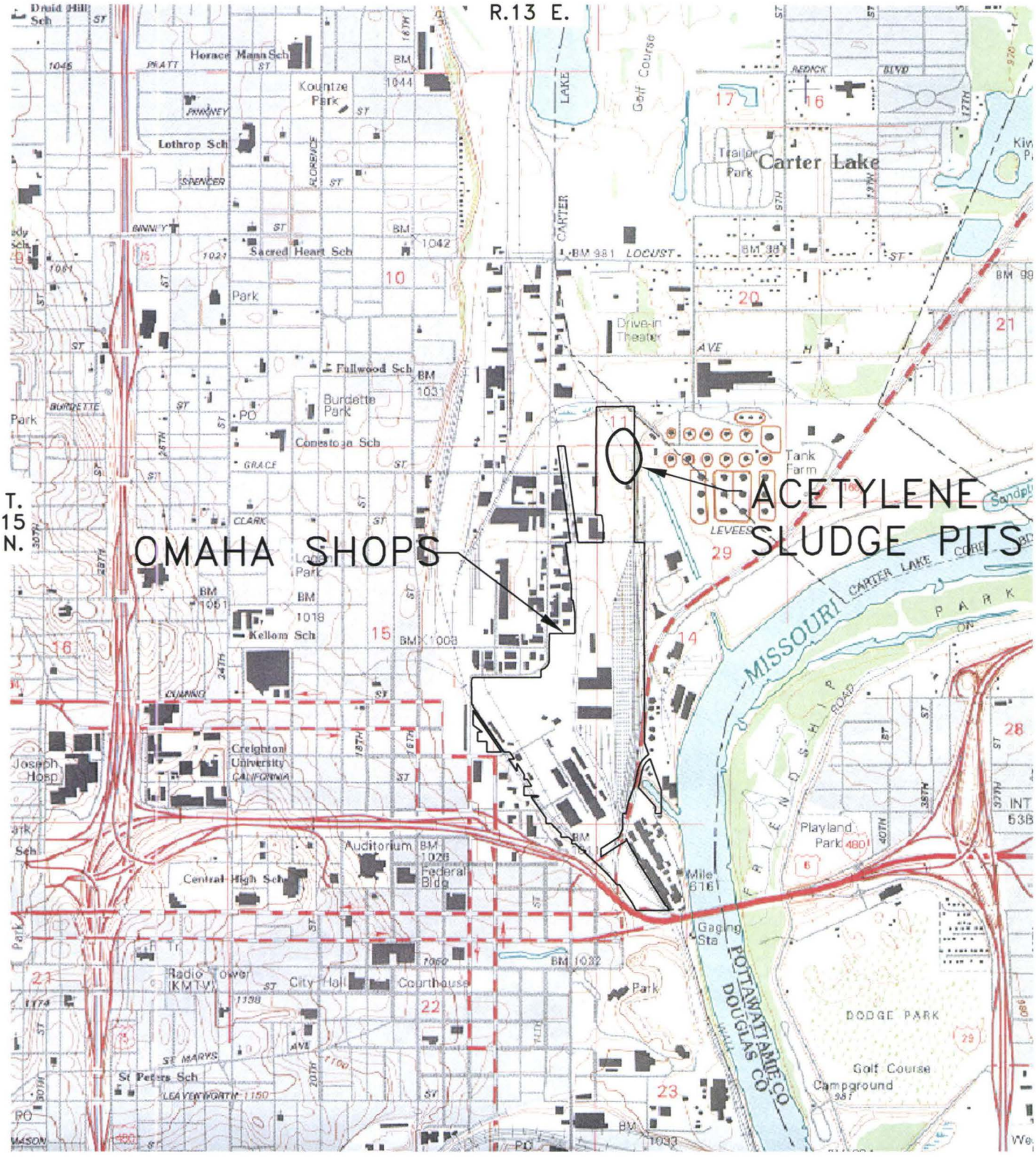
ANALYTICAL METHOD	PARAMETER	NO. OF FIELD SAMPLES	NO. OF FIELD REPLICATES	NO. OF MS/MSD SAMPLES	TOTAL NO. OF SAMPLES
Soil					
8260	VOCs	8	1	1/NA	10

NA = Not Applicable

TABLE 2

SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES UPRR OMAHA SHOPS FACILITY

ANALYTICAL METHOD	PARAMETER	CONTAINERS PER SAMPLE	MINIMUM SAMPLE SIZE	PRESERVATION	HOLDING TIME
Soil					
8260	VOC	Two 4-oz VOA jars with Teflon-lined lids	10 grams	4° C	14 days



NEBRASKA

QUADRANGLE LOCATION

BASE MAP SOURCE: USGS 7.5 MINUTE SERIES (TOPOGRAPHIC) QUADRANGLE MAP OF OMAHA NORTH, NE.–IA., 1994.

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OMAHA SHOPS LOCATION

UNION PACIFIC

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY DAP	DATE 12/15/99	PROJECT NO. 45-091MC204.04	FIG. NO. 1
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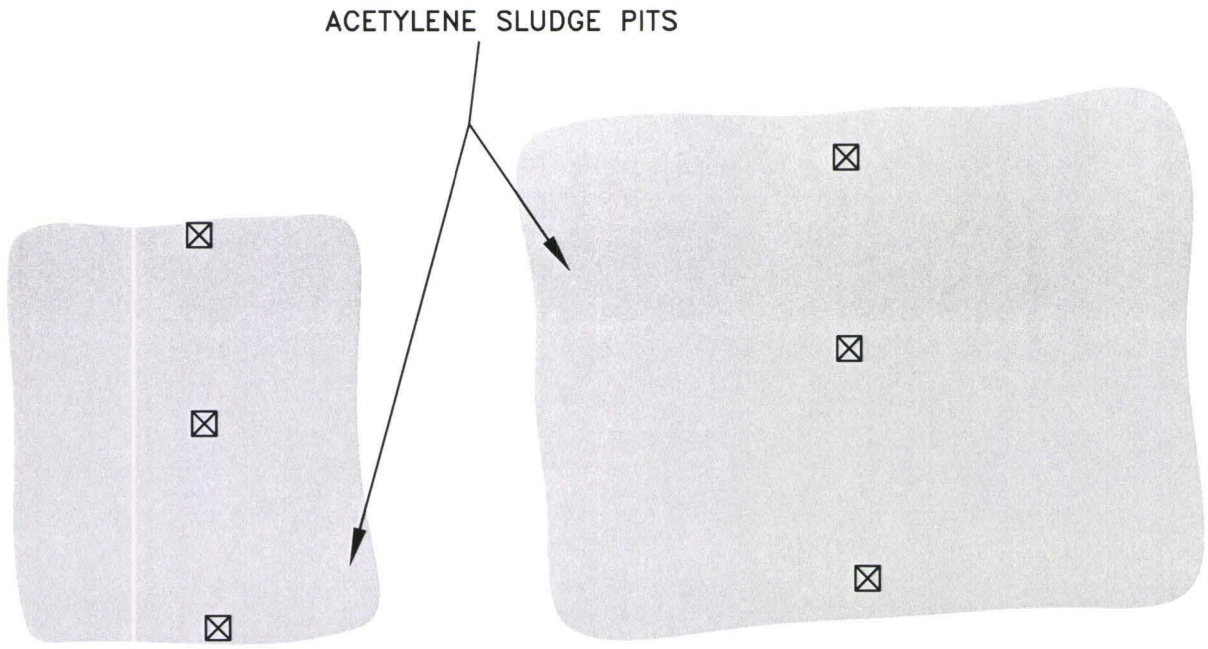

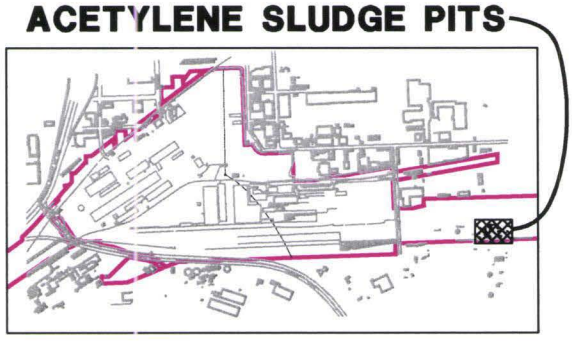

KEY PLAN

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⊠ PREVIOUS TRENCH SOIL SAMPLE

PROPERTY LINE

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Xrefs: uprrpropline.DWG DRILLHOLES.DWG

SWMU 20-ACETYLENE SLUDGE PITS
SITE PLAN

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY DAP	DATE 12/15/99	PROJECT NO. 45-091MC204.04	FIG. NO. 2
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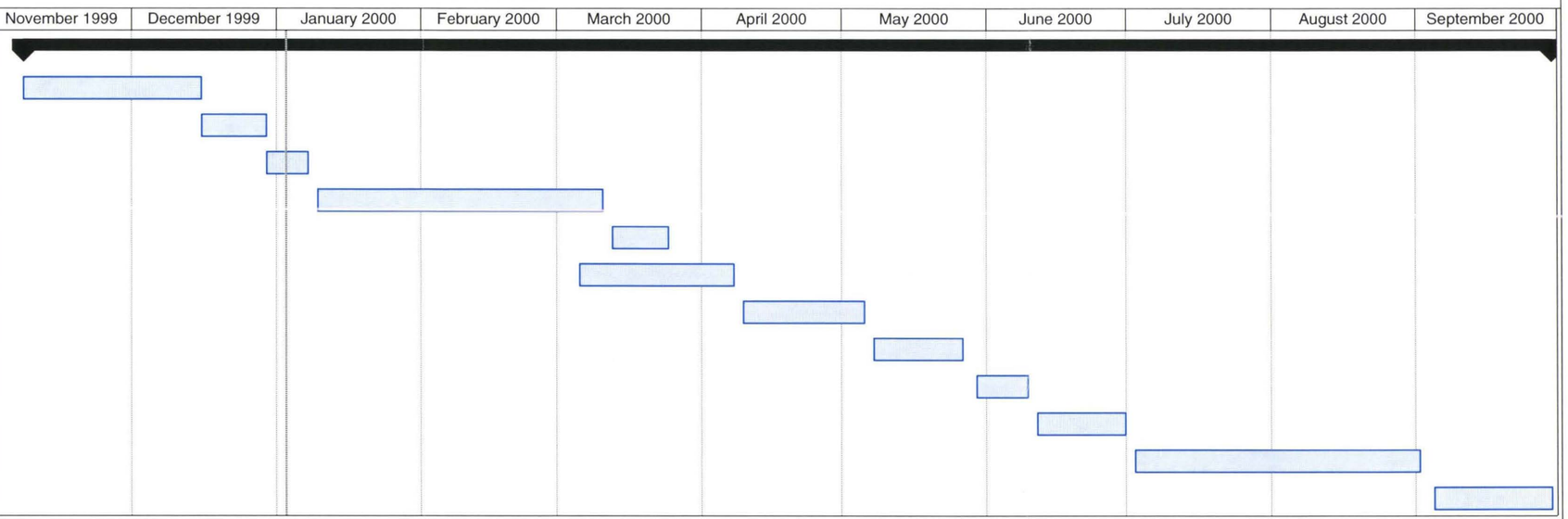
FIGURE 3
UPRR OMAHA SHOPS
IM PROJECT SCHEDULE

ID	Task Name	Duration	Start	Finish
1	**Acetylene Sludge Pits**	**327 days**	**Mon 11/8/99**	**Fri 9/29/00**
2	Internal Draft Planning Memo	38 days	Mon 11/8/99	Wed 12/15/99
3	UPRR Review	14 days	Thu 12/16/99	Wed 12/29/99
4	Draft Planning Memorandum	9 days	Thu 12/30/99	Fri 1/7/00
5	EPA Review	61 days	Mon 1/10/00	Fri 3/10/00
6	Final Planning Memorandum	12 days	Mon 3/13/00	Fri 3/24/00
7	Procurement	33 days	Mon 3/6/00	Fri 4/7/00
8	Field Work	26 days	Mon 4/10/00	Fri 5/5/00
9	Internal Draft Report	19 days	Mon 5/8/00	Fri 5/26/00
10	UPRR Review	11 days	Tue 5/30/00	Fri 6/9/00
11	Draft Report	19 days	Mon 6/12/00	Fri 6/30/00
12	EPA Review	61 days	Mon 7/3/00	Fri 9/1/00
13	Final Report	25 days	Tue 9/5/00	Fri 9/29/00



Project: Aspimf3
Date: Mon 1/3/00

Task | Progress | Summary | Rolled Up Split | Rolled Up Progress | Project Summary
Split | Milestone | Rolled Up Task | Rolled Up Milestone | External Tasks

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ACBM	Asbestos-Containing Building Materials
ACM	Asbestos-Containing Material
AOC	Area of Concern
ARARs	Applicable or Relevant and Appropriate Requirements
AST	Aboveground Storage Tank
bgs	below ground surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CM	Corrective Measures
CMS	Corrective Measures Study
COPC	Chemical of Potential Concern
HI	Hazard Index
ID	Inside Diameter
IM	Interim Measures
LTU	Land Treatment Unit
msl	mean sea level
NCP	National Contingency Plan
NDEC	Nebraska Department of Environmental Control
NDEQ	Nebraska Department of Environmental Quality
NET	National Environmental Testing
O&M	Operation and Maintenance
OD	Outside Diameter
OU1	Operable Unit 1
OU2	Operable Unit 2
OU3	Operable Unit 3
PA	Preliminary Assessment
PAHs	Polycyclic Aromatic Hydrocarbons
PCE	Tetrachloroethylene
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PPE	Personal Protective Equipment
ppm	parts per million
PRGs	Preliminary Remediation Goals
QA/QC	Quality Assurance/Quality Control
RAPMA	Remedial Action Plan Monitoring Act
RBCs	Risk-Based Concentrations
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RfD	Reference Dose
RFI	RCRA Facility Investigation

RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable Maximum Exposure
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SCEM	Site Conceptual Exposure Model
SCS	Soil Conservation Service
SF	Slope Factor
SVOCs	Semivolatile Organic Compounds
SWMU	Solid Waste Management Unit
TBC	To Be Considered
TEH	Total Extractable Hydrocarbons
TMV	Toxicity, Mobility, and Volume
TRPH	Total Recoverable Petroleum Hydrocarbons
TSA	Temporary Storage Area
TWA	Time-Weighted Average
TRW	Technical Review Workshop
UCL	Upper Confidence Limit
UPRR	Union Pacific Railroad Company
URSGWC	URS Greiner Woodward Clyde
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds
WWTP	Waste Water Treatment Plant

1.1 AUTHORITY

The Union Pacific Railroad Company (UPRR) Omaha Shops encompass approximately 184 acres lying north of downtown Omaha, Nebraska and just west of the Missouri River (Figure 1-1). The Omaha Shops are the subject of a pending Administrative Order on Consent (Order) under Section 3008(h) of the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act (RCRA) of 1976, as amended. In response to the pending Order, UPRR has contracted URS Greiner Woodward Clyde (URSGWC) to complete a Corrective Measures Study (CMS) at the Omaha Shops.

Based on the results of the RCRA Facility Assessment (RFA) (Tetra Tech 1998) and the Omaha Shops' former classification as an interim status RCRA storage facility, the Omaha Shops are the subject of a pending Order which is expected to include the following facility-wide objectives:

- Evaluate the need for Interim Measures (IM) at the Omaha Shops to address contamination to relieve threats to human health or the environment
- Perform IM that are necessary to control contamination at the Omaha Shops or to relieve threats to human health or the environment, or to prevent or minimize the spread of contaminants while long-term corrective measures are being implemented
- Perform a RCRA Facility Investigation(s) (RFI) to determine the nature and extent of any release of hazardous waste or hazardous constituents at or from the Omaha Shops
- Perform a Corrective Measures Study(ies) (CMS) to identify and evaluate alternatives for the corrective measures necessary to prevent, mitigate, or remediate any releases of hazardous wastes or hazardous constituents at or from the Omaha Shops
- Implement necessary corrective measure(s) at the Omaha Shops
- Perform any other activities necessary to correct or evaluate actual or potential threats to human health and/or the environment resulting from the release or potential release of hazardous waste or hazardous constituents at or from the Omaha Shops

1.2 OPERABLE UNITS

The Order includes provisions to divide the Omaha Shops into three operable units for ease of administration and to accelerate corrective measures in certain areas. The operable units are shown on Figure 1-2 and include the following:

- Operable Unit No. 1 (OU1) includes surface soils above the normal high water table within the portion of the Omaha Shops that is proposed to be acquired by the City of Omaha for development of a public-use building project.
- Operable Unit No. 2 (OU2) includes surface soils above the normal high water table within the portion of the Omaha Shops not included in OU1.
- Operable Unit No. 3 (OU3) includes the groundwater underlying the Omaha Shops, at the normal high water table and below.

The Omaha Shops property has been the target of several development proposals since 1987. These development proposals have included public recreational facilities, mixed-use commercial/residential developments, and heavy industrial facilities. The Omaha Shops is currently being considered by the City of Omaha as the preferred site for development of a large public-use facility, potentially including a convention center and sports arena. Dividing the Omaha Shops into three operable units recognizes the potential for this development and provides flexibility to facilitate the City of Omaha's schedule requirements.

1.3 PURPOSE AND SCOPE

The purpose of this report is to address the requirements of the Order for a RCRA CMS Report for OU1 at the Omaha Shops.

The OU1 RFI addressed 19 Solid Waste Management Units (SWMUs) and 14 Areas of Concern (AOCs) as specified in the Pending Administrative Order (USEPA 1999). The term SWMU is normally restricted to active sites, but because the exact locations within some of the sites where waste was generated are difficult to define, inactive sites were identified as SWMUs. The 33 OU1 RFI sites are identified in Table 1-1.

The purpose of this CMS Report is to briefly summarize and update the current conditions at OU1 and known nature and extent of contamination as documented by the RFI Report. The document will present the CMS screening and evaluation process and propose a corrective measure technology that addresses the lead contamination in soils at OU1. Petroleum hydrocarbons and asbestos contamination in soils will be handled under separate interim measures.

1.4 LOCATION AND DESCRIPTION

The Omaha Shops are located at 9th and Webster Streets in Omaha, Douglas County, Nebraska (North 41°15'58" latitude, West 95°55'40" longitude). The legal description of the facility is Township 15 North, Range 13 East, Section 22. The Omaha Shops encompass approximately 184 acres located just west of the Missouri River in an industrialized area of downtown Omaha (Figure 1-1). The OU1 area is approximately 133 acres of the Omaha Shops property.

The site consisted of various buildings and production support areas, each having a function in past operations of the facility. SWMUs and AOCs are shown in Figure 1-3. Currently, only the Coach Shop, Print Shop, and Research and Development Laboratory are still operational. The Superintendents Building and B&B Shop are currently utilized for office and storage space.

1.5 OPERATIONAL HISTORY

The Omaha Shops were in operation for approximately 100 years, with principal functions as a railroad fueling facility, repair shop, paint shop, and car body repair shop for UPRR's locomotive and car fleet.

UPRR used steam engines from the 1860s until the mid-1950s. The original steam engines were fueled by burning wood, coal, oil, fuel oil, and petroleum-based fuel. They required little lubrication and had no electrical components. In the mid-1950s, diesel power became the predominant source of power for train locomotives. During that time, the entire facility was converted from handling steam engines to diesel engines.

From the 1950s to 1988, the site was a major overhaul and maintenance facility for UPRR. In 1988, most of the operations, except the Print Shop and the Car Shop, moved to Little Rock, Arkansas. After the operations were moved in 1988, facility demolition began.

Specific operational history for OU1 is detailed in the RFI Report (URSGWC 1999).

1.6 PREVIOUS INVESTIGATIONS

1.6.1 PCB Survey

In 1987 and 1988, USPCI completed a PCB electrical transformer fluid survey at the Omaha Shops. According to the survey results, 57 transformers were identified as containing PCB fluids. Concentrations ranged from 0.3 parts per million (ppm) to 932 ppm PCBs. At the time of the survey, 12 of the 57 transformers were in service; three of the 12 transformers contained PCBs at concentrations greater than 240 ppm (241, 254, and 440 ppm), and the remaining nine transformers had PCB concentrations of less than 60 ppm (49, 48, 51, 56, 46, 52, 39, 48, and 51 ppm). The remaining 45 transformers identified as containing PCB fluids were removed from service or disposed of by USPCI (USPCI 1988a).

1.6.2 Asbestos Survey

SOS International completed an asbestos survey of the Omaha Shops in 1988. SOS collected 14 samples of suspected asbestos-containing building materials (ACBM). Six of these samples tested positive for asbestos with concentrations ranging from 35 percent to 90 percent chrysotile asbestos. Ten samples were collected from the outside steam line insulation. Five of these samples contained asbestos. Pipe insulation was examined in the North Locker Room and one sample was collected. The sample contained 90 percent chrysotile asbestos. The Power House pipe insulation and boiler area sampling involved collecting two samples, both of which were found not to contain asbestos. A spray-applied material observed on the walls of Store No. 2 was suspected of containing asbestos, and one sample was collected. This sample was found not to contain asbestos (SOS 1988).

Of the buildings that were demolished, all ACBM was removed and disposed of prior to building demolition.

1.6.3 Preliminary Site Assessment

USPCI completed a preliminary site assessment of the Omaha Shops in 1988. The assessment included a facility walk-through and historical records search. Results of the survey identified a number of current and historical areas which were considered to be areas of potential environmental concern (USPCI 1988b). No action was taken as a result of the Preliminary Site

Assessment. Information gathered in the report was used in the planning of subsequent activities.

1.6.4 Fuel Recovery System

A diesel fuel recovery system was installed in 1988 by Terracon and continues to operate. During construction of the Abbott Drive overpass, diesel fuel was discovered on the groundwater near the south end of the Omaha Shops. A total of 13 recovery wells were installed at depths of approximately 27 to 28 feet (Terracon 1988).

1.6.5 Site Investigation

HDR completed a Site Investigation of the Omaha Shops in 1989 and 1990 as a follow-up assessment to the USPCI preliminary site assessment. Field investigations included hand auger borings , truck-mounted drill rig borings, monitoring well installation and sampling, and soil vapor analysis. The Site Investigation report, dated April 1990, focused on the following 14 areas, some of which are identified as SWMUs or AOCs in the Order:

Area	SWMU or AOC
• Blue Building	SWMU 4
• Car Shop	SWMUs 16 & 17
• Wheel Shop	SWMUs 13, 22, & 23
• Babbitt Shop	SWMU 3
• Traction Motor/Locomotive Shop	SWMU 6
• Roundhouse	SWMU 1
• Acetylene Pit	SWMU 11
• Eighth Street Yard	AOC 10
• Car Dismantle Area	AOC 8
• Oil Pipeline	AOC 16
• Open Drum Storage	SWMU 24
• Temporary Hazardous Waste Storage Area	SWMU 8
• Transformer Storage Area	SWMU 15
• Wastewater Treatment Area/Fuel Storage	SWMU 3, AOC 3

Petroleum hydrocarbons, lead, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and asbestos were detected as follows:

- Petroleum hydrocarbons were detected in the following areas:
  - Stores No. 2
  - Wastewater Treatment Area/Babbitt Shop
  - Traction Motor Shop
  - Oil Tanks/Pump House
  - Grace Street Tank
  - Oil Pipeline (selected locations)
- Soil lead levels exceeded 1,000 ppm in the following areas:
  - Babbitt Shop
  - Paint Barrel Pits (also exceeded EP Toxicity levels for lead)
  - Open Drum Storage Area North
  - Eighth Street Yard South
- SVOCs and VOCs were detected at several areas.
- Asbestos was detected above the reporting limit in the Car Dismantle Area and Open Drum Storage Area.

1.6.6 Phase II Site Assessment

In 1992 , part of the Omaha Shops became a candidate site for an automotive assembly facility. A Phase II site assessment was completed in the Construction Area of the proposed automotive assembly facility. The fieldwork for 19 soil borings was completed during February and March 1992 (W-C 1995). Soil samples were analyzed for VOCs, SVOCs, pesticides, PCBs, petroleum hydrocarbons, metals, and asbestos. The low levels of VOCs, SVOCs, pesticides/PCBs, and TPH detected in the soil samples from the Construction Area were determined not likely to represent a serious threat to human health or the environment. Similarly, most of the metals detected in the soil samples from the Construction Area were present at concentrations that were determined not likely to represent a serious threat to human health or the environment.

1.6.7 Remedial Action Plan Monitoring Act

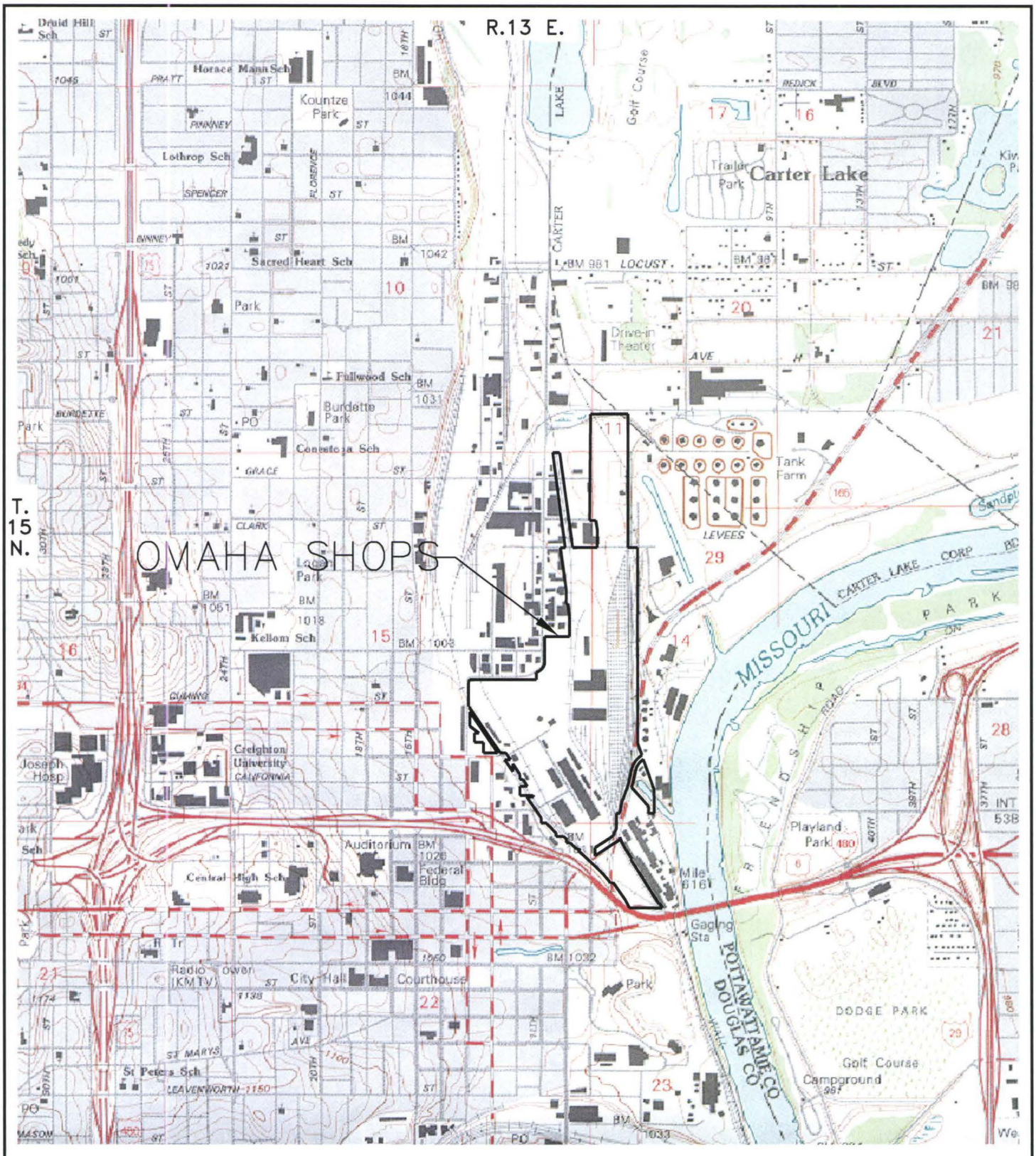
In January 1996, UPRR applied to participate in the Nebraska Remedial Action Plan Monitoring Act (RAPMA) Program. The RAPMA Program, authorized by the Nebraska Legislature in 1994, allows NDEQ to coordinate and oversee efforts by property owners, prospective buyers, lending institutions, or others wishing to initiate voluntary environmental cleanup activities. As part of the RAPMA Program, UPRR submitted a draft remedial action plan to NDEQ in January 1997 to describe potential development activities for the Omaha Shops (Woodward-Clyde 1996). The plan described remedial action objectives and activities to be undertaken to redevelop the Omaha Shops facility for commercial use.

1.6.8 USEPA Studies

In 1995, the United States Environmental Protection Agency (USEPA) contracted Tetra Tech Inc. to conduct a RCRA preliminary assessment (PA) at the Omaha Shops. Tetra Tech completed a preliminary review and visual site inspections in July and August of 1995. An additional site visit was completed in July 1997. Based on the preliminary review and visual site inspections, an RFA was prepared in June 1998 (Tetra Tech 1998).

1.6.9 RCRA Facility Investigation (RFI)

URSGWC completed an RFI for OU1 in 1999. The RFI addressed 19 SWMUs and 14 AOCs as specified in the pending Order (USEPA 1999). The rationale and recommendations in this document are based on information detailed in the RFI report (URSGWC 1999).



NEBRASKA

QUADRANGLE LOCATION

BASE MAP SOURCE: USGS 7.5 MINUTE SERIES (TOPOGRAPHIC) QUADRANGLE MAP OF OMAHA NORTH, NE.–IA., 1994.

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OMAHA SHOPS LOCATION

UNION PACIFIC

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

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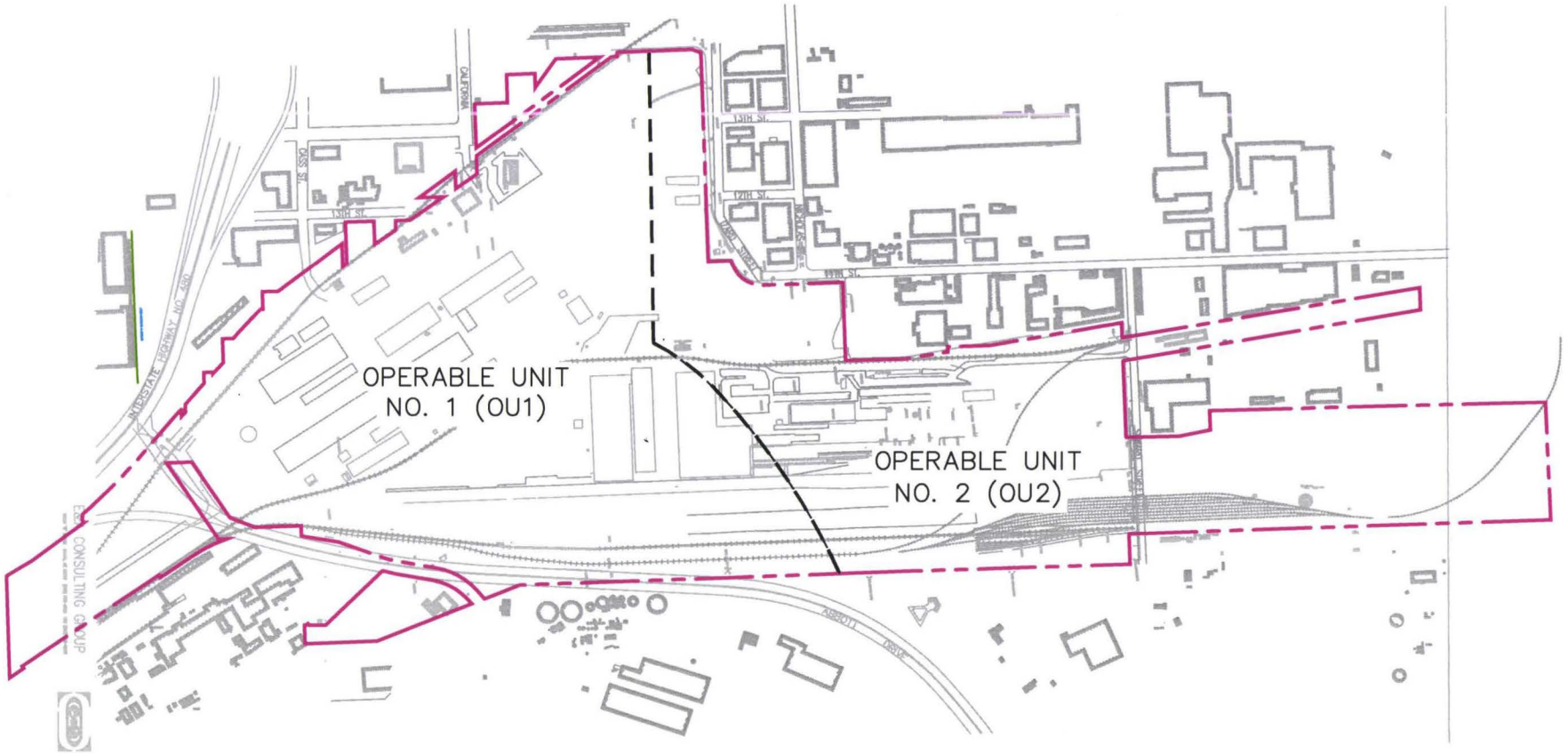

NOTE:
OPERABLE UNIT NO. 3 (OU3) INCLUDES GROUNDWATER UNDERLYING THE ENTIRE OMAHA SHOPS PROPERTY.

LEGEND

PROPERTY LINE

OPERABLE UNIT

800 400 0 800

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OPERABLE UNITS

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY DAP	DATE 11/30/99	PROJECT NO.	FIG. NO.
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Xrefs: uprrpropline.DWG DRILLHOLES.DWG

LEGEND

- (23) SOLID WASTE MANAGEMENT UNIT
- (9) AREAS OF CONCERN
- PROPERTY LINE
- OU1 BOUNDARY
- STRUCTURES

AREAS OF CONCERN

1 DIESEL SERVICING FACILITY
2 EAST AND WEST STORES AREAS
3 DIESEL FUEL STORAGE TANK
4 OIL RECEIVING AREA
5 FUEL STORAGE AREA
6 CHEMICAL STORAGE BUILDING
7 OIL TANKS/PUMP HOUSE
8 EAST AND WEST CAR DISMANTLE AREAS
9 OIL AND WASTE HOUSE
10 EIGHTH STREET YARD
15 DIESEL FUEL UNLOAD FACILITY
16 OIL PIPELINE
17 PRINT SHOP
18 LUBE OIL STORAGE AND PUMPHOUSE

SOLID WASTE MANAGEMENT UNITS

1 ROUNDHOUSE
2 OLD RESEARCH LABORATORY
3 BABBIT SHOP/WASTEWATER TREATMENT PLANT
4 BLUE BUILDING
5 NEW TRANSFORMER STORAGE AREA
6 TRACTION MOTOR SHOP/MACHINE SHOP
7 RESEARCH AND DEVELOPMENT LABORATORY
7.1 RESEARCH AND DEVELOPMENT LABORATORY PARTS WASHER.
8 TEMPORARY HAZARDOUS WASTE STORAGE AREA
9 OLD TRACTION MOTOR SHOP
10 WHEEL KNOCK-OFF SHOP
11 ACETYLENE PIT
12 OLD AND NEW POWER HOUSES/WASTE OIL TANK
13 WHEEL SHOP
15 OLD TRANSFORMER STORAGE AREA
16 STEEL CAR SHOP
16.1 STEEL CAR SHOP HAZARDOUS WASTE STORAGE AREA
16.2 STEEL CAR SHOP NONHAZARDOUS WASTE STORAGE AREA
16.3 STEEL CAR SHOP SATELLITE ACCUMULATION AREAS
17 TIN AND PLATING SHOP
17.1 TIN AND PLATING SHOP PARTS WASHER
19 FUEL RECOVERY AREA
22 OLD PAINT SHOP
22.1 OLD PAINT SHOP SATELLITE ACCUMULATION AREA
23 NEW PAINT SHOP
23.1 NEW PAINT SHOP ENCLOSED PAINT BOOTH
23.2 NEW PAINT SHOP OPEN PAINT BOOTH
23.3 NEW PAINT SHOP SATELLITE ACCUMULATION AREA
24 INTERIM STATUS CONTAINER STORAGE AREA

N

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SCALE IN FEET

November 30, 1999 9:07:36 a.m.
Drawing: T:\91MC204\T2100\F1-3_T2100.DWG (DAP)
Xrefs: uprrpropline.DWG DRILLHOLES.DWG

OU1 SWMU AND AOC LOCATION MAP

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY DAP	DATE 11/30/99	PROJECT NO.	FIG. NO.
CHK'D BY .	REVISION 0	45-091MC204.02	1-3

The following section briefly describes the physical and environmental setting at the Omaha Shops, including the nature and extent of contamination at OU1.

2.1 GEOLOGY AND HYDROGEOLOGY

The Omaha Shops facility was constructed within the Missouri River floodplain. The site was prone to periodic flooding prior to 1952, when the U.S. Army Corps of Engineers built a levee and floodwall along the river, which currently protect the Omaha Shops from flooding.

Shallow unconsolidated deposits at the site are characterized by fill and alluvium. Previous investigations at and near the site indicate that fill ranges in thickness from 1 to 9 feet, with the thickest fill near the current river channel. The fill consist of cinders, bricks, glass, metal, and gravel in a matrix of silt (HDR 1990). Alluvial deposits, consisting of interbedded clay, silt, sand, and gravel, underlie the fill. The alluvial sequence lies above bedrock, which is about 20 to 50 feet below ground surface (bgs) (UPRR 1984). The location of cross section lines and generalized cross sections representing the subsurface conditions at the Omaha Shops are shown in Figures 2-1 and 2-2a through 2-2d.

Bedrock is of Pennsylvanian age and consists of alternating beds of limestone and shale. Three different formations are normally encountered in this location; the Wyandotte Limestone, the Lane Shale, and the Iola Limestone. These formations are of the Kansas City Group of the Missouri Series (UPRR 1984).

Shallow groundwater is encountered at the site at depths ranging from approximately 3 to 15 feet bgs (W-C 1995). Groundwater appears to flow northeasterly, with a calculated hydraulic gradient in the direction of flow estimated at 0.01 feet per foot (HDR 1990). The alluvial sediments are expected to have a low hydraulic conductivity with a range of 0.3 to 0.003 feet per day. Hydraulic recharge is likely from surface infiltration due to the porous characteristics of the surface fill materials (UPRR 1984).

2.2 NATURE AND EXTENT OF CONTAMINATION

The distribution of contaminants in soil has been defined for OU1. Volatile organic compounds, semivolatile organic compounds, pesticides/PCBs, petroleum hydrocarbons, metals, and asbestos were detected in surface and subsurface soils at OU1. The chemical data generally indicate a random vertical and horizontal distribution of potential chemicals of concern in surface and subsurface soils at OU1. Soil samples were collected from shallow and intermediate soils with a maximum depth of 16 feet bgs. The RFI report (URSGWC 1999) presents an in-depth discussion of the findings from the RFI.

Lead was detected in elevated concentrations throughout the OU1 investigation area (Figure 2-3). Soil borings located in the eastern portion of OU1 contained the highest concentrations of lead in soil and generally decreased in concentration with westward movement. The highest concentrations of lead were detected in surface soil and shallow soil (0 to 3 feet) and rapidly reduced in concentration with depth. However, detections of lead were found above background

as deep as 16 feet bgs. Twenty soil samples (predominately surface soil samples) exceeded the preliminary remediation goal of 1,218 mg/kg, as calculated using the EPA TRW Guidance for determining the level of lead in soil acceptable to protect adults and fetuses.

Elevated concentrations of petroleum hydrocarbons in soils are confined to the southeast portion of OU1. Asbestos was detected in surface soil and shallow soil. The soil results indicate low levels of asbestos exist in soils located primarily in the northwest portion of OU1, around the former Car Dismantle Area and Blue Building. The petroleum hydrocarbons and asbestos will be handled under separate interim measures.

2.3 CONTAMINANT FATE AND TRANSPORT

Environmental fate of chemicals in the identified pathways of release is influenced by each chemical's physicochemical properties. The organic chemicals of potential concern are petroleum hydrocarbons. Inorganic chemicals of potential concern are lead and asbestos. The environmental fate of these contaminants is primarily influenced by their chemical-specific properties for water solubility, soil adsorption, volatilization, and biodegradation.

The mobility of lead in the soil is generally low, even in areas of high concentrations. Lead is sparingly mobile in the natural environment because lead that is leached from ores is readily adsorbed by ferric hydroxide or combines with carbonate or sulfate ions to form insoluble compounds. Lead is significantly influenced by adsorption to ferric compounds, sediments, and organic matter (Hydrometrics 1995). The mobility of lead in soil is generally higher in high-pH soils due to a higher volume that is leached from the ores. However, the soils at the Omaha Shops are not high in pH.

2.4 HUMAN HEALTH RISKS

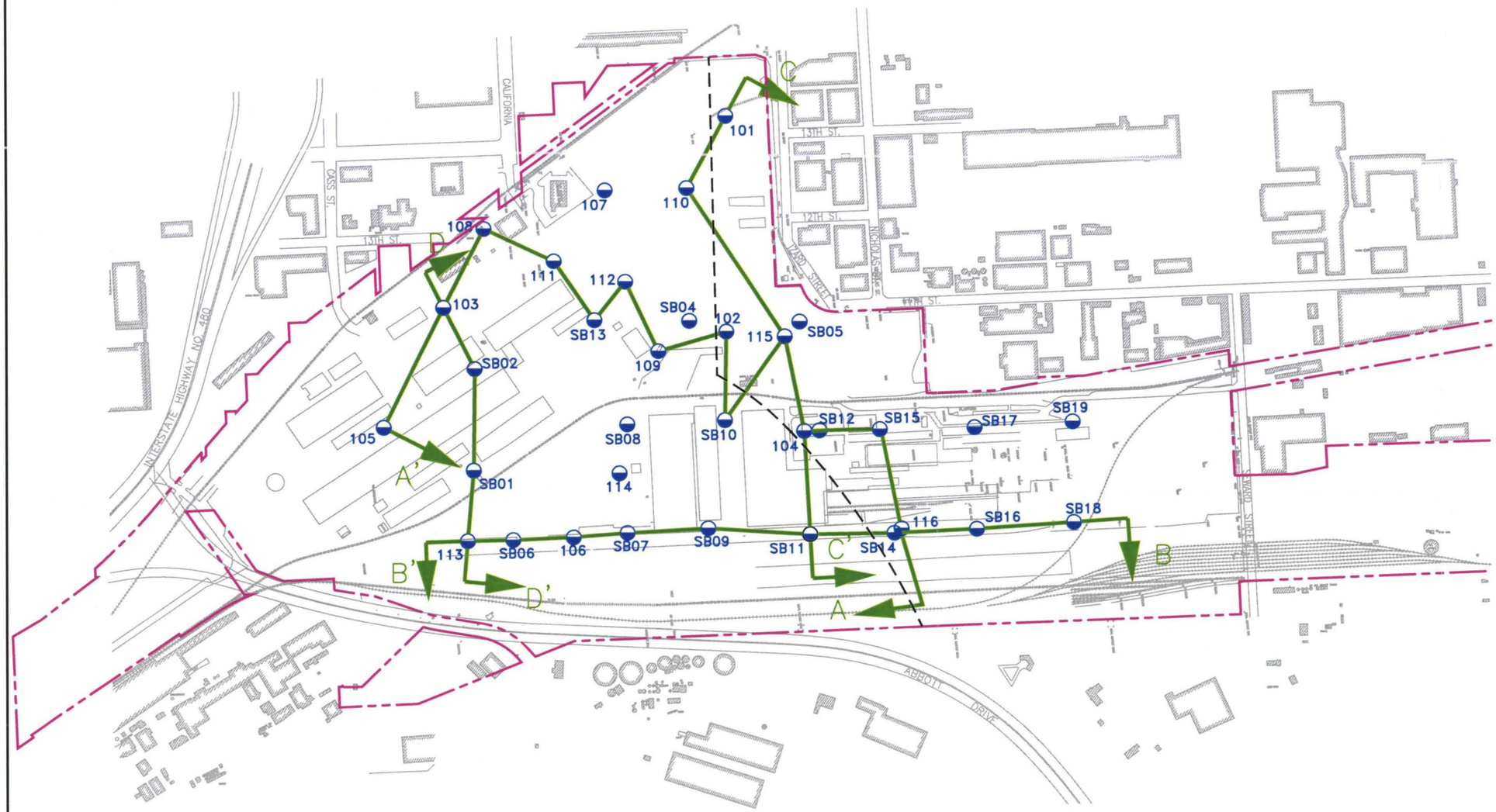
Risks to human health were assessed using current measured contaminant concentrations for the following scenarios: occupational workers, construction workers, and recreational users/ trespassers. Estimated risks for construction workers were below the USEPA target risk range of 1×10^{-6} to 1×10^{-4} and a hazard index (HI) of 1. Estimated risks for occupational workers and recreational users/trespassers exceeded the low end, but were below the upper end, of the USEPA target risk range of 1×10^{-6} to 1×10^{-4}. A detailed Human Health Risk Assessment is presented in the RFI Report (URSGWC 1999). A brief summary for each scenario is presented below.

- Occupational receptors were assumed to be exposed (via ingestion, dermal contact, and inhalation) to contaminated surface soil. The worst case total (HI) calculated for was 0.3, well below the USEPA target value of 1. This indicates that no adverse noncarcinogenic health effects are likely to occur from surface soil exposures for occupational receptors at OU1. The estimated total lifetime excess cancer risk under the assumed chronic exposure condition was 3×10^{-5} under the worst case scenario. This level is within the USEPA target risk range of 1×10^{-6} to 1×10^{-4} for exposure to chemicals released from hazardous waste sites (USEPA 1990a, 1990c, 1991b).

- Construction workers were assumed to be exposed (via ingestion, dermal contact, and inhalation) to total soil. The worst case HI and excess cancer risk were calculated at 0.4 and 5×10^{-7}, well below the target values that indicate unacceptable risks to construction workers from exposure to site soils.
- Recreational users/trespassers were assumed to be exposed to surface soils through ingestion, dermal contact, and inhalation. The worst case HI and excess cancer risk were 0.04 and 2×10^{-6}, respectively. The HI indicates that no adverse health effects are likely to occur from exposure to surface soil. The excess cancer risk is within the target limits, but is at the low end, indicating that unacceptable risks are not likely from exposure to site soils.

LEGEND

- BORINGS FOR UPRR PROJECTS
- PROPERTY LINE
- OU1 BOUNDARY
- CROSS SECTION (A, A')
- STRUCTURES



500 250 0 500

SCALE IN FEET

GEOLOGIC CROSS SECTION LINES

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY DAP	DATE 11/30/99	PROJECT NO.	FIG. NO.
CHK'D BY .	REVISION 0	45-091MC204.02	2-1

November 30, 1999 9:11:43 a.m.
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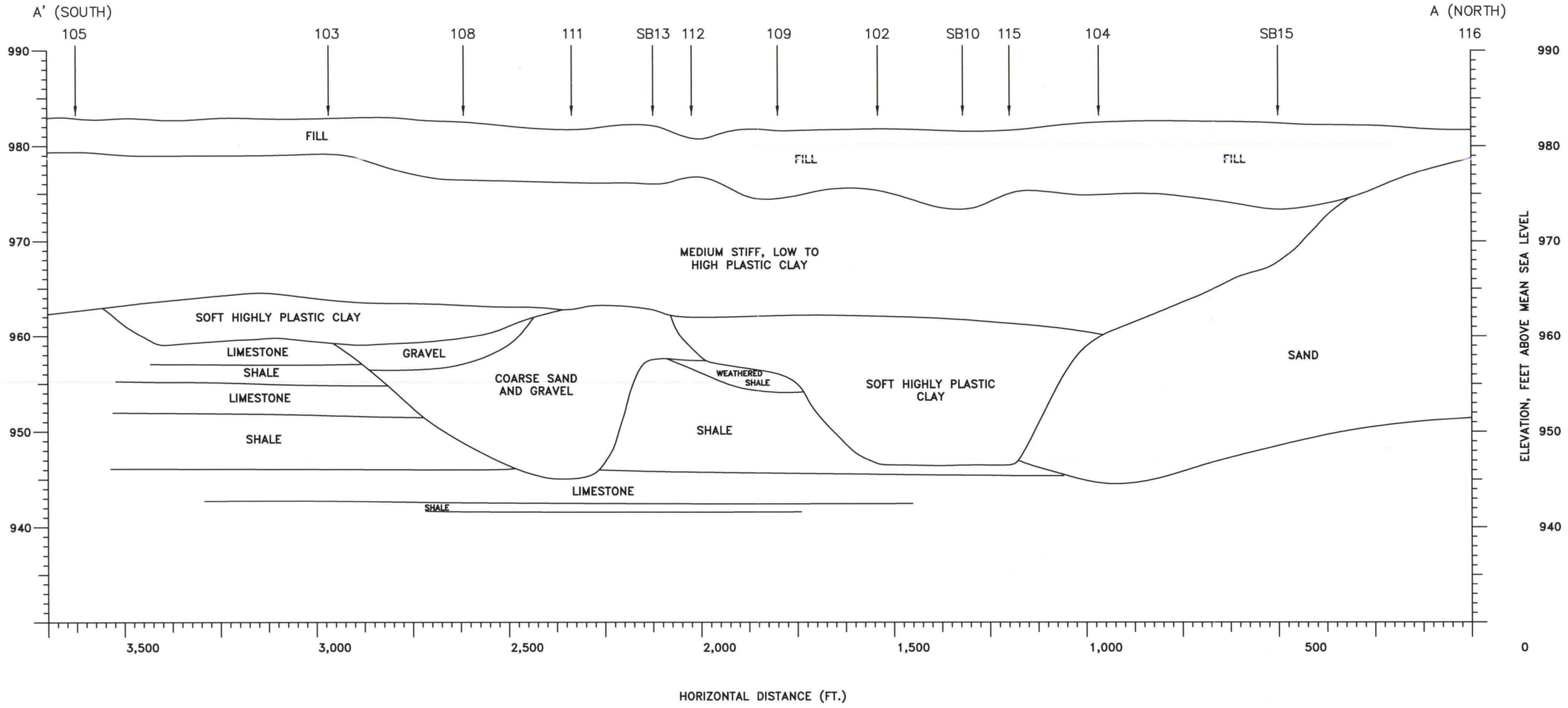


NOTE:

THIS FIGURE REPRESENTS A CONCEPTUAL GEOLOGIC MODEL INTERPRETED FROM DATA COLLECTED BY WOODWARD-CLYDE (1992). ACTUAL LITHOLOGIES MAY VARY FROM THE SHOWN INTERPRETATION.

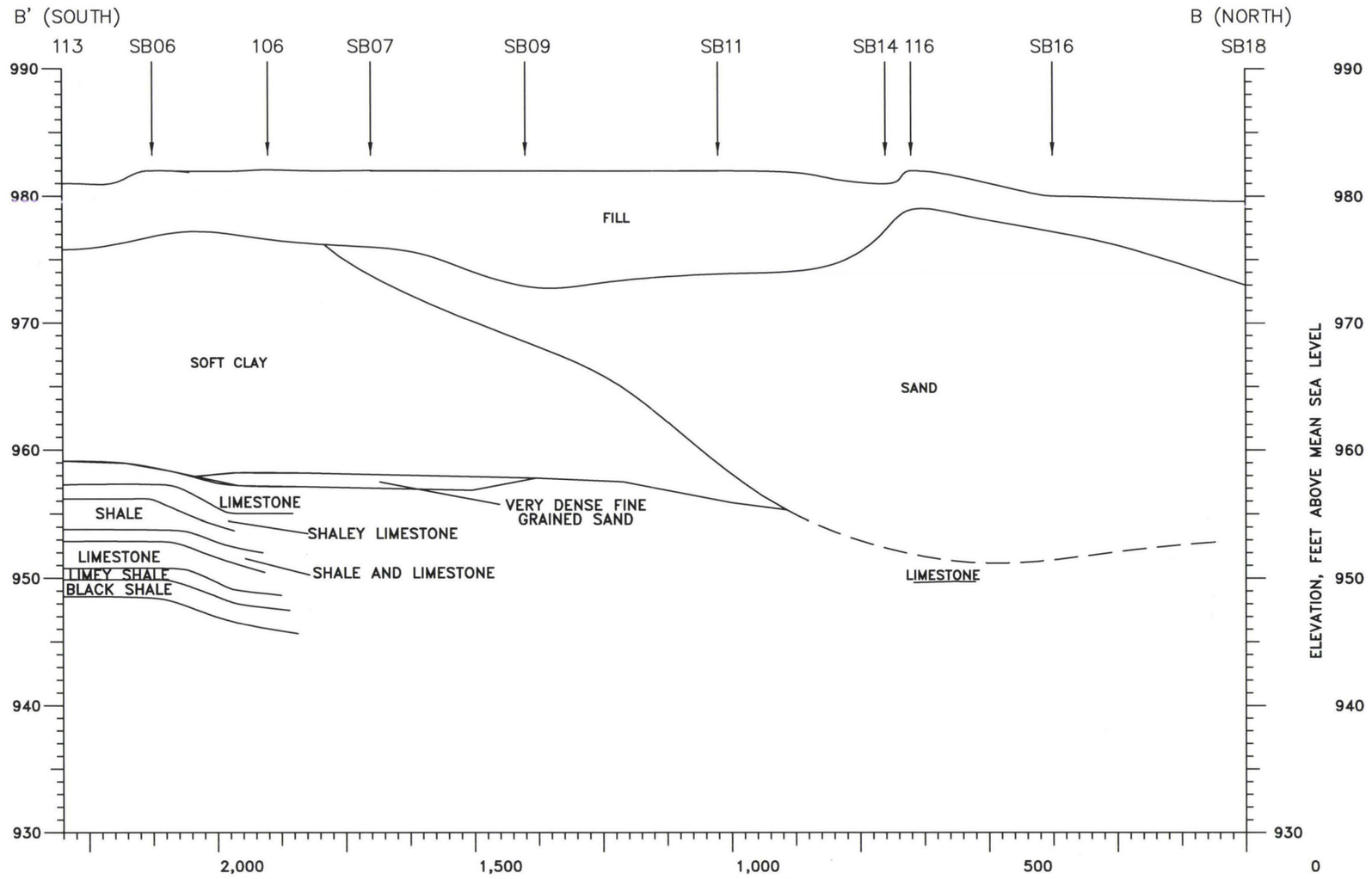
October 07, 1999 3:31:31 p.m.
Drawing: T:\91MC204\T2100\F2-2A_T2100.DWG (TSM)

GEOLOGIC CROSS SECTION A-A'

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY CRP	DATE 10/07/99	PROJECT NO.	FIG. NO.
CHK'D BY JAW	REVISION 0	45-091MC204.02	2-2a



NOTE:

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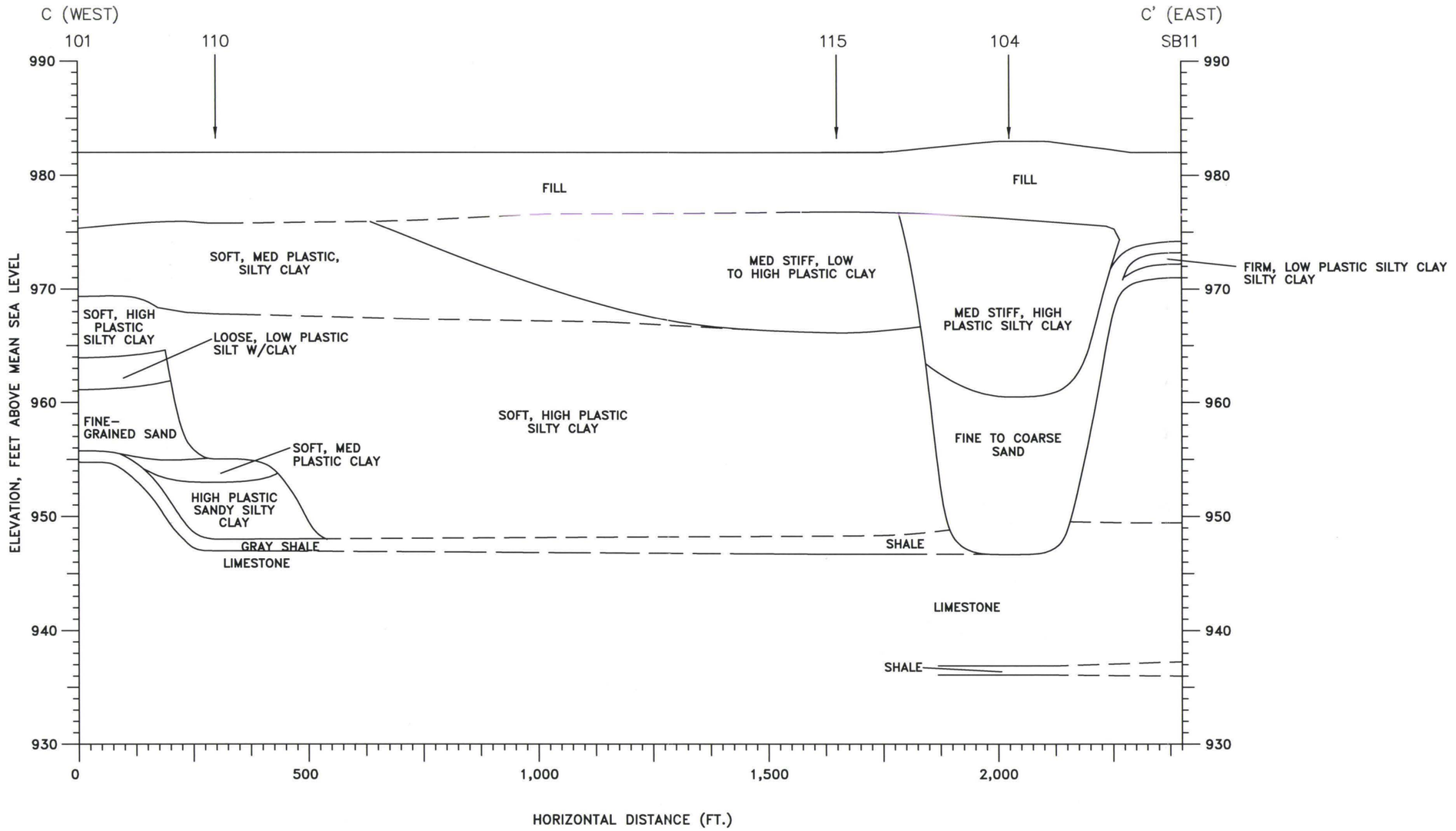
October 07, 1999 3:32:42 p.m.
Drawing: T:\91MC204\T2100\F2-2B_T2100.DWG (TSM)

GEOLOGIC CROSS SECTION B-B'

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY TSSM	DATE 10/07/99	PROJECT NO.	FIG. NO.
CHK'D BY JAW	REVISION 0	45-091MC204.02	2-2b



NOTE:

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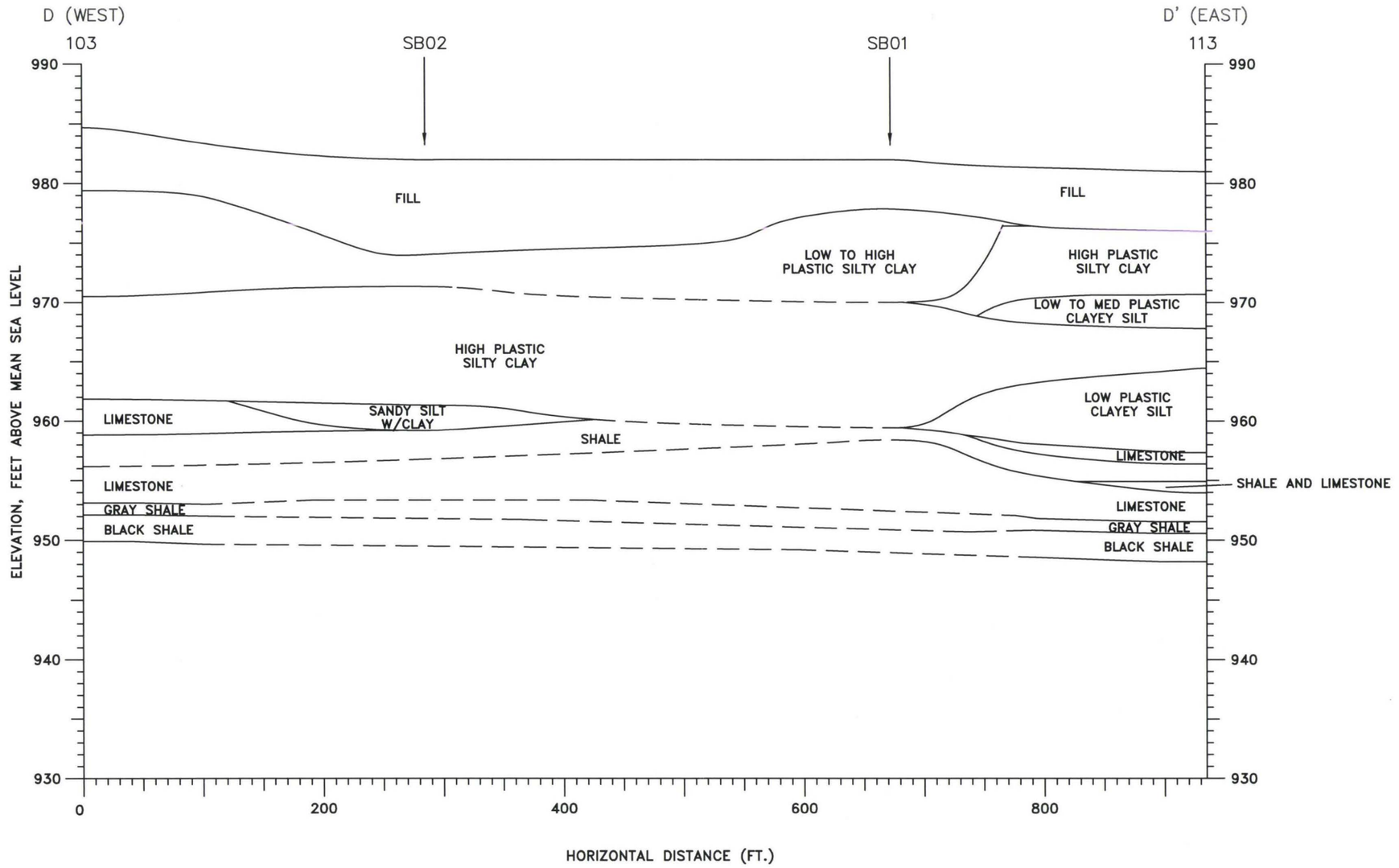
Drawing: T:\91MC204\T2100\F2-2C_T2100.DWG (TSM)

GEOLOGIC CROSS SECTION C-C'

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY TSSM	DATE 10/07/99	PROJECT NO.	FIG. NO.
CHK'D BY JAW	REVISION 0	45-091MC204.02	2-2c



NOTE:

THIS FIGURE REPRESENTS A CONCEPTUAL GEOLOGIC MODEL INTERPRETED FROM DATA COLLECTED BY WOODWARD-CLYDE (1992). ACTUAL LITHOLOGIES MAY VARY FROM THE SHOWN INTERPRETATION.

October 07, 1999 3:35:07 p.m.
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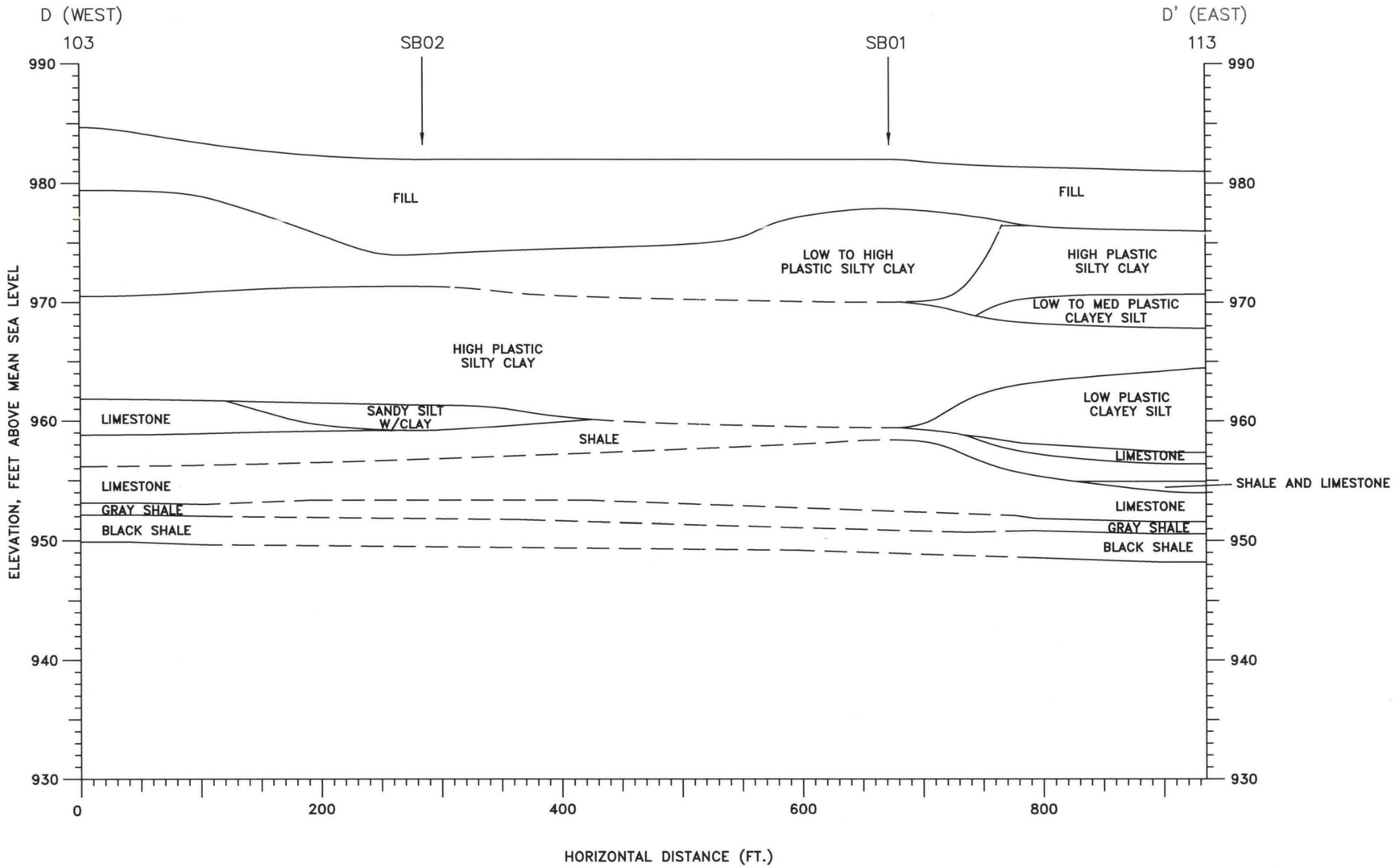
GEOLOGIC CROSS SECTION D-D'

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY TSSM	DATE 10/06/99	PROJECT NO.	FIG. NO.
CHK'D BY JAW	REVISION 0	45-091MC204.02	2-2d



NOTE:

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October 07, 1999 3:35:07 p.m.
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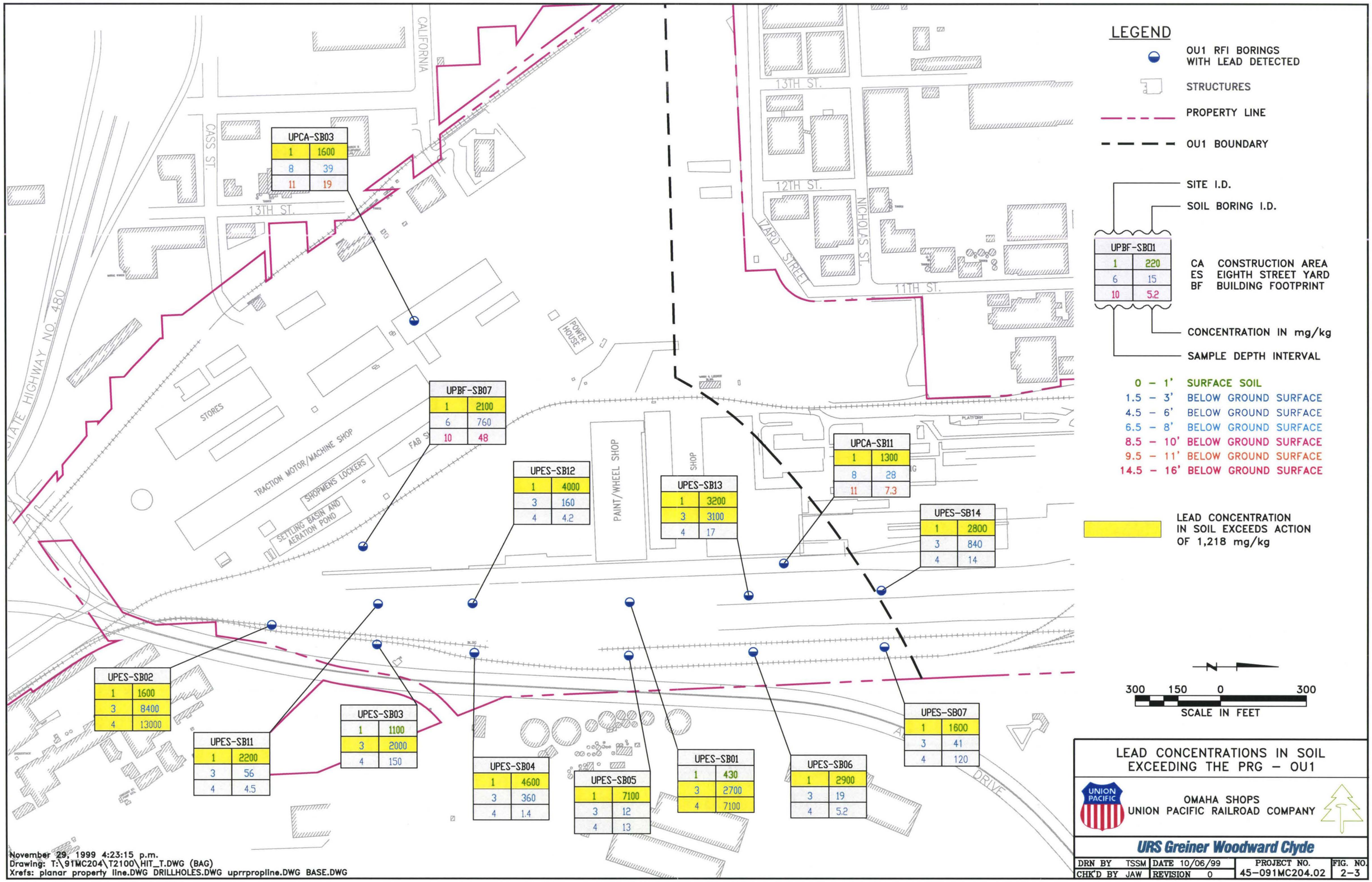
GEOLOGIC CROSS SECTION D-D'

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY	TSSM	DATE	10/06/99	PROJECT NO.	FIG. NO.
CHK'D BY	JAW	REVISION	0	45-091MC204.02	2-2d



LEAD CONCENTRATIONS IN SOIL EXCEEDING THE PRG – OU1

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY	TSSM	DATE	10/06/99	PROJECT NO.	FIG. NO.
CHK'D BY	JAW	REVISION	0	45-091MC204.02	2-3

November 29, 1999 4:23:15 p.m.
Drawing: T:\91MC204\T2100\HIT_T.DWG (BAG)
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SECTION THREE Corrective Measure Objectives and Technology Screening

The Corrective Measure (CM) technology was chosen with the intent of providing a technically feasible, cost-effective CM for OU1. The CM technology was evaluated based on the ability to protect human health and the environment and to satisfy the CM objectives.

3.1 CORRECTIVE MEASURE OBJECTIVES

To be consistent with the Pending Administrative Order, the corrective measure will be completed in accordance with Appendix E of the Administrative Order and include the following basic RCRA elements:

- Be protective of human health and the environment
- Attain media cleanup goals
- Control the source(s) so as to reduce or further eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment
- Comply with waste management standards

The contaminant at OU1 is lead in surface and shallow soils. Future releases to the site are believed to have been eliminated because operations within OU1 and the property adjacent to OU1 have ceased. Human exposure to the soil contaminants can be reduced or eliminated through institutional and engineering controls. This would achieve the basic standard of the Pending Administrative Order, which is to protect human health and the environment.

3.1.1 Media and Waste Management Standards

Certain standards must be considered during the development of site-specific objectives so that the CM achieves the basic standards of attaining media cleanup standards and complying with waste management standards. The RFI (URSGWC 1999) details the requirements for identification of applicable standards and provides a comprehensive list of standards that may potentially apply to the CM. The list of standards is presented in Appendix A.

3.1.2 Media of Concern

EPA's Risk Assessment Guide for Superfund (EPA 1991b) states that it is generally appropriate to evaluate contaminants in those media where the cumulative current or future excess cancer risk is greater than 1×10^{-4} or the HI is greater than 1.

Contamination has been found to exist in surface and shallow soils throughout the OU1 investigation area. Therefore, there is the potential for receptors to be affected by exposure to site soils.

Surface water does not exist at the site and, therefore, is not a media of concern. A CMS for groundwater will be completed as OU3 and, for the purposes of this document, will not be considered a media of concern.

3.1.3 Chemicals of Concern

USEPA guidance (USEPA 1991b) recommends that a chemical in a medium that has an associated risk be retained as a chemical of potential concern (COPC) for that medium. The Human Health Risk Assessment, presented in the RFI report (URSGWC 1999), compared site data to background concentrations in order to determine a list of chemicals that may potentially be of concern at OU1. This list of chemicals was then evaluated and individual constituents were either eliminated or retained as chemicals of concern based on detection frequency and concentration, essential nutrient status, exposure assessments, and risk assessment. The Human Health Risk Assessment (RFI, URSGWC 1999) concluded that the chemicals of concern at OU1 are lead and asbestos (asbestos will be addressed as an interim measure).

3.1.4 Present and Future Land Uses

Land use surrounding the Omaha Shops is predominantly industrial/commercial. Neighboring businesses include the Omaha Dock, William Brothers, ASARCO, Nebraska Machinery, Caterpillar, Air Products, Air Lite Plastics, UPRR Research and Development Laboratory, Aaron Ferer Scrap Metal, Cargill, Rochester Highland, American Vending, The Woodworks, Ready Mix Concrete, and The City of Omaha Maintenance Shop, Recycling Center and Fire Training Area.

In the past, the shops have been the subject of investigations that have produced information to support the development of the property. In 1992, the property was a candidate for an automobile assembly facility. The property was also considered by UPRR as the location for a new headquarters. Currently, the property is a candidate site for a large public-use area that includes a sports arena and convention center. Potential future uses, therefore, may include public use or continuing as an industrial and commercial area.

3.1.5 OU1 Corrective Measure Objectives

The proposed objectives focus on the exposure setting for which protection will be provided. Exposure settings take into account the COPCs, media of concern, and exposure pathways. The consideration of exposure pathways is important since protection may be achieved by reducing the likelihood of exposure, as well as reducing contaminant levels.

The CM Objectives proposed for OU1, based on proposed future land use, site knowledge, and potential risks, are:

- To reduce the potential for the current occupants, future construction workers, and recreational users to be exposed to site surface and shallow soils with lead levels in excess of 1,218 mg/kg
- To reduce the potential for future construction workers performing intrusive work to come into contact with subsurface soils containing lead in excess of the levels mentioned above
- To ensure the objectives mentioned above are still met after completion of future construction work

Additionally, contaminated material and waste streams that result from the CM will be treated, stored, and disposed of in accordance with all appropriate waste management standards.

3.2 EVALUATION AND SCREENING OF CORRECTIVE MEASURE TECHNOLOGIES

The evaluation and screening of technologies and corrective measure development, based on USEPA guidance, will be completed to address soils contaminated with lead. The final CM Alternative will be the alternative selected to best address lead contamination in soils.

Standard guidance recommends that potential CM technologies pass a two-step screening process in order to be considered a potential remedial alternative. The screening process is completed as follows:

- A list of CM categories is developed. The categories usually consist of: no action, institutional controls, natural attenuation, removal, containment, treatment, and disposal.
- CM technologies are placed into the appropriate category.
- The CM technologies that are not technically feasible or not applicable to the site conditions are screened out.
- The remaining CM technologies are further screened on the basis of effectiveness, implementability, and cost. The CM technologies that pass this screening are developed into CM alternatives. Alternatives may be a stand-alone technology or a combination of technologies.
- CM alternatives undergo a detailed screening process based on five criteria: long-term effectiveness; reduction of toxicity, mobility, and volume (TMV); short-term effectiveness; implementability; and cost.
- Based on the final screening, a CM alternative is selected.

This section will present the evaluation and screening of the technologies to address lead-contaminated soils. A conceptual design of the combined alternative will be presented in Section 4.

3.2.1 General Corrective Measure Categories

General categories of CM that could be implemented alone or in combination at OU1 include the following:

No Action – Would leave the site "as is," with no provisions for monitoring or control. The no action alternative will be included in the initial screening because it represents the baseline conditions at the site.

Institutional Controls – Would involve measures to protect property from trespassers, restrict future land use, and protect construction workers during intrusive activities.

Natural Attenuation – Would involve naturally occurring processes to naturally remediate the contaminant in soil.

Removal – Would involve excavating the source contamination in soils.

Containment – Would involve physically restricting the mobility of contaminants left in place through physical barriers.

Treatment and Disposal – Would involve treatment and disposal of contaminated media.

3.2.2 Initial Screening of Corrective Measures Technologies and Process Options

The CM technologies and process options that could potentially be used to implement the corrective measure for lead contamination in soil are listed categorically in Table 3-1. The list was developed based on experience, a review of applicable USEPA documents, pertinent textbooks and published articles, and vendor information.

The potential technologies and process options were reviewed to screen out those technologies' process options that are not technically feasible or applicable to the existing site conditions. Table 3-2 presents the results of this initial screening evaluation, including a brief description of each option, the contaminants the option may potentially be applied to, and whether the option is retained or eliminated based on its applicability.

3.2.3 Detailed Screening of Applicable Technologies and Process Options

The corrective measure technologies and process options carried forward from the initial screening were further screened to facilitate the development of alternatives. The screening criteria considered during this evaluation included effectiveness, implementability, and relative cost.

- Effectiveness
  - Ability to handle estimated volumes of contaminated media and to meet remediation goals
  - Adequacy and reliability of controls
- Implementability
  - Ability to construct technology
  - Availability of equipment, materials, and labor to construct and operate the technology
- Relative Cost
  - Capital and operation and maintenance (O&M) cost considered
  - Qualitative ranking within each CM category of "high," "medium," or "low"

Table 3-3 presents the results of this second screening evaluation, including comments on the evaluation, implementability, and relative cost. Technologies that survived the second screening were carried forward into the development of CM alternatives.

3.3 DEVELOPMENT OF CORRECTIVE MEASURE ALTERNATIVES

This section details the CM alternatives selected to potentially address soils contaminated with lead. The alternatives were assembled using the technology and process options that passed the screening as discussed in Section 3.2 and detailed in Tables 3-1, 3-2, and 3-3. Three commonly used methods of addressing heavy metals in soils are:

- Excavation and Disposal – Physical removal and placement in an appropriate disposal facility.
- Solidification/Stabilization – Limit mobility of contaminants within the soil matrix through the addition of cement, lime, or fly ash, especially in soils failing TCLP.
- Cover – Prevent contact with contaminants by placing a barrier between potential receptors and contaminants.

A detailed evaluation of the three alternatives selected to address lead-contaminated soils is presented in Table 3-4. Feasibility-level cost estimates for each of the alternatives are presented in Appendix B.

3.3.1 Alternative 1A – Excavate and Dispose of Lead-Contaminated Soils

Alternative 1A consists of excavating the top 12 inches of site soils in areas that contain greater than 1,218 mg/kg of lead. The limits of excavation are shown on Figure 3-1. The depth of the excavation was selected based on case studies for lead in soils at similar sites. Excavated soils would be placed on manifested trucks for transportation to the Douglas County Landfill for disposal. The excavation would then be backfilled to the original grade with clean material obtained from a local borrow source.

Capital costs associated with the alternative are excavation, transportation, disposal fees, and backfill. Capital costs are estimated at $4.8 million. It has been assumed for the sake of the estimate that excavation and disposal will be adequate to close the site, thus eliminating the need for future O&M. Costs for O&M are estimated to be $0. Feasibility-level estimates for the alternative are presented in Appendix B.

3.3.2 Alternative 1B – Cover Lead-Contaminated Soils

Alternative 1B consists of a permeable soil cover that will be placed over all areas of OU1 that have lead contamination in excess of 1,218 mg/kg. The limits of the excavation are shown on Figure 3-2.

The cover will consist of a colored geotextile fabric laid over the contaminated areas. The purpose of the fabric is to provide a visual "warning" layer to construction workers to cease digging in the area. The geotextile will be overlain by a minimum of 12 inches of low plastic, silty clay fill, capable of sustaining vegetative growth, acquired from a local borrow source. The thickness of the cover was selected based on case studies for lead in soils at similar sites. The fill will be graded in such a manner as to prevent ponding of rainwater on the surface of the cover.

Capital costs associated with the alternative are estimated at $1.02 million. O&M costs include maintenance, inspection, and repair of the cover. O&M is estimated to cost approximately $15,500 annually. Present worth costs for a 15-year duration are estimated at $1.18 million. Likely, O&M will continue for longer, but for the purposes of this document, it was calculated for 15 years. Costs are detailed in Appendix B.

3.4 DETAILED ANALYSIS OF CORRECTIVE MEASURE ALTERNATIVES

The CM alternatives were assembled based on the ability to meet the CM objectives. In order to meet the goal of the pending Administrative Order, a relative evaluation of each of the alternatives was done based on the following five RCRA Subpart S selection criteria as presented in Table 3-4.

3.4.1 Long-Term Reliability and Effectiveness

This criterion addresses the risk remaining at the site after a particular remedial action has taken place and objectives have been met. The primary considerations of this criterion are:

- Magnitude of residual risk
- Adequacy and reliability of controls

3.4.2 Reduction of Toxicity, Mobility, and Volume

This criterion addresses the regulatory preference for corrective measures that involve treatment to reduce TMV of the principal contaminants at the site. The primary considerations of this criterion are:

- Treatment process used and materials treated
- Amount of hazardous materials treated or destroyed
- Degree of expected reductions in TMV
- Degree to which treatment is irreversible
- Type and quantity of residuals after treatment

3.4.3 Short-term Effectiveness

This criterion considers the short-term effectiveness of alternatives by assessing the following:

- Protection of workers and the community during the corrective measure
- Environmental impacts
- Time until the corrective measure objectives are met

3.4.4 Implementability

This criterion assesses the implementability of each alternative in terms of technical feasibility, administrative feasibility, and availability of services and materials.

3.4.5 Cost

This criterion assesses the capital cost, O&M cost, and present worth of the alternative.

3.5 DESCRIPTION OF SELECTED CORRECTIVE MEASURE ALTERNATIVE BY CONTAMINANT OF CONCERN

This section presents the preferred corrective measure for addressing lead contamination within OU1. The corrective measure was selected based on the ability to provide a technically feasible, cost-effective means of meeting the CM objectives for OU1 as evaluated in Section 3.4 and Table 3-4. A conceptual design of the final corrective measure is presented in Section 4.

Alternative 1C was chosen as the preferred alternative to address lead-contaminated soils. The alternative will address any site soils exceeding the action level for lead. The alternative will address lead-contaminated soils by covering the contaminated areas with a minimum of 12 inches of clean fill material capable of sustaining vegetative growth. The material will be acquired from a local borrow source. As an additional measure of protection, a permeable, colored, geotextile layer will be laid over the site prior to placing the cover material. The geotextile will serve as a "warning" layer to construction workers doing intrusive work in the area.

TABLE 3-1

CANDIDATE TECHNOLOGIES AND PROCESS OPTIONS FOR LEAD IN SOILS

General Corrective Measure	Technology	Process Option
No Action	None	None
Institutional Controls	Restrictive Covenants	Land Use Restrictions
		Construction Oversight
		Fencing
	Site Monitoring	Soil Sampling
Removal	Physical Removal	Excavation
Containment	Capping	Soil Cap
		Concrete/Asphalt Cap
		Multi-layer Cap
		Geomembrane Cap
Treatment/Disposal	Stabilization/Solidification	Cement Stabilization
		Lime Stabilization
	Landfill	RCRA Subtitle D Landfill
		RCRA Subtitle C Landfill

TABLE 3-2

INITIAL SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS FOR LEAD IN SOILS

Category	Technology	Process Option	Description	Applicable Contaminant(s)
No Action	None	None	Do nothing to achieve corrective measure objectives.	Yes. Retain as a baseline.
Institutional Controls	Restrictive Covenants	Land Use Restrictions	Place restrictions on land use	Yes
		Construction Oversight	Requires notification to landowner prior to intrusive activities to prevent workers from working in covered areas without proper protection.	Yes
		Fencing	Place fences and signs to prevent unauthorized access.	Yes
	Site Monitoring	Soil Sampling	Periodic sampling to monitor contamination.	Yes
Removal	Physical Removal	Excavation	Remove source contamination by means of mechanical equipment to reduce risk.	Yes
Containment	Capping	Soil Cap	Install soil barrier over contaminated soils to prevent contact by human receptors.	Yes
		Concrete/Asphalt Cap	Install concrete or asphalt barrier over contaminated soils to prevent contact by human receptors.	Yes
		Multi-layer Cap	Install barrier with impermeable barrier, drainage layer, and protective cover over contaminated soils to prevent contact by human receptors.	Yes
		Geomembrane Cap	Install geomembrane layer over contaminated soils to prevent contact by human receptors.	Yes
Treatment/Disposal	Solidification/ Stabilization	Cement Stabilization	Use cement, lime, or fly ash and mix with the contaminated matrix to create a stable form.	Yes
		Vitrification	Use high-energy joule heating to "melt" soil matrix and solidify contaminants within the matrix.	Yes
	Landfill	RCRA Subtitle D Landfill	Dispose of contaminated soils in certified municipal landfill permitted to accept the contaminated materials.	Yes
		RCRA Subtitle C Landfill	Dispose of contaminated soils in certified hazardous waste landfill.	Yes

TABLE 3-3

DETAILED SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS FOR LEAD IN SOILS

Category	Technology	Process Option	Effectiveness	Implementability	Relative Cost	Retain(?)
No Action	None	None	Does not address CM objectives.	Nothing to implement.	No Capital. No O&M.	Yes.
Institutional Controls	Restrictive Covenants	Land Use Restrictions	Limits exposures by requiring notification prior to intrusive work.	Easily implemented with some legal assistance.	Low Capital. Low O&M.	Yes.
		Construction Oversight	Limits exposures by investigating areas prior to construction work.	Easily implemented with some legal assistance. Investigating areas prior to construction may create some construction delays.	Low Capital. Low O&M.	Yes.
		Fencing	May limit exposures by preventing access.	Easily implemented. May require frequent maintenance to insure effectiveness.	Low Capital. Low O&M.	No. Does not meet objectives
	Site Monitoring	Soil Sampling	Provides no protection to exposures. Useful to document changes in site conditions over time.	Easily implemented. Technical staff and laboratory required.	Low Capital. Low O&M.	Yes.
Removal	Physical Removal	Excavation	Depending upon limits of excavation, can provide partial to complete site remediation.	Easily implemented. Equipment and labor readily available.	High Capital. Low O&M.	Yes.
Containment	Capping	Soil Cap	Will effectively provide protection of exposures to contaminated soils by human receptors. Contamination will remain in place.	Easily implemented. Equipment, materials, and labor readily available.	Low Capital. Low O&M.	Yes.
		Concrete/Asphalt Cap	Will effectively provide protection of exposures to contaminated soils by human receptors. Contamination will remain in place.	Easily implemented. Equipment, materials, and labor readily available.	Medium Capital. Low O&M.	No.
		Multi-layer Cap	Will effectively provide protection of exposures to contaminated soils by human receptors. Contamination will remain in place.	Easily implemented. Equipment, materials, and labor readily available.	High Capital. Low O&M.	No.
		Geomembrane Cap	Will effectively provide protection of exposures to contaminated soils by human receptors. Contamination will remain in place.	Easily implemented. Equipment, materials, and labor readily available.	High Capital. Low O&M.	No.
Treatment and Disposal	Solidification/ Stabilization	Lime/Cement/Fly Ash Stabilization	Effectively immobilizes lead in soils, especially soils failing TCLP.	Easily implemented. Requires space for stockpiling and mixing of soils.	Medium Capital. Low O&M.	No.
		Vitrification	Effectively immobilizes lead in soils.	Easily implemented. Requires electricity source.	High Capital. Low O&M.	No. Very expensive.
	Landfill	RCRA Subtitle D Landfill	Effectively contains contaminated material.	Easily implemented. Locating landfill that accepts asbestos and petroleum hydrocarbon-contaminated soils may be difficult.	High Capital. Low O&M.	Yes.
		RCRA Subtitle C Landfill	Effectively contains contaminated material. May require long hauling distances to landfill.	Easily implemented by using excavation technology. Location of nearest landfill is approximately 550 miles.	High Capital. Low O&M.	Yes.

TABLE 3-4

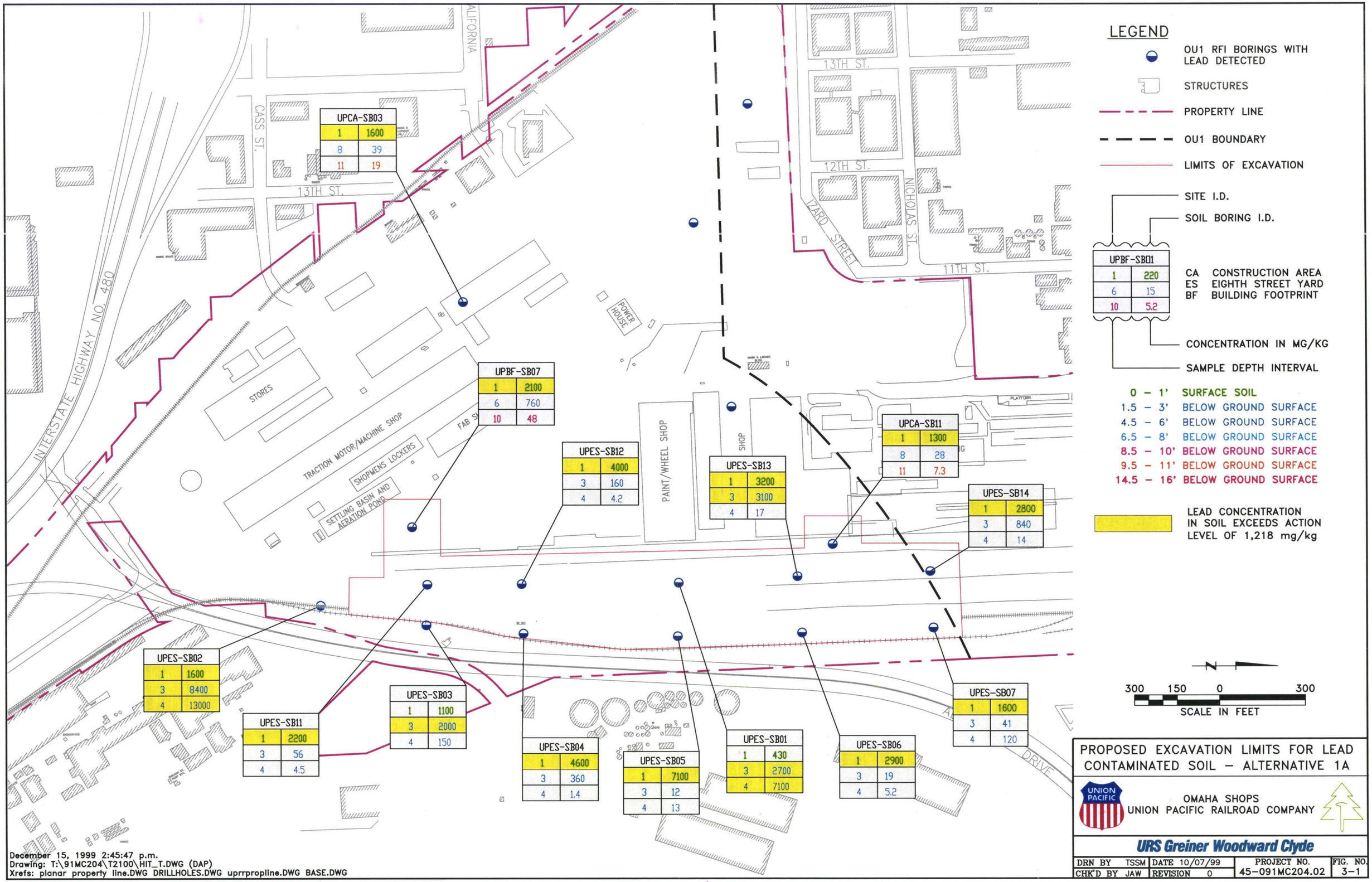
DETAILED ANALYSIS OF CORRECTIVE MEASURE ALTERNATIVES FOR LEAD-CONTAMINATED SOILS

Evaluation Criterion	Alternative 1A Excavate and Dispose	Alternative 1B Cover
LONG-TERM RELIABILITY AND EFFECTIVENESS		
Magnitude of residual risk	Long-term risk is mitigated by removing contaminated soils.	Long-term risk is mitigated with a properly maintained cover.
Adequacy and reliability of controls	Excavation and disposal deemed adequate and reliable to address lead-contaminated soils.	Cover deemed adequate and reliable if properly maintained.
Protection of recreational users if used as a public use facility	Excavation and disposal will provide long-term protection for recreational users.	Cover will provide long-term protection for recreational users if properly maintained.
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME (TMV) OF WASTES		
Treatment process used and materials treated	Removal and off-site disposal for lead-contaminated soils.	Cover to prevent contact between potential receptors and lead-contaminated soils.
Amount of materials treated	46,800 tons of lead-contaminated soil would be treated.	46,800 tons of lead-contaminated soil would be covered.
Degree of expected reduction in TMV	Excavation and disposal will provide a complete reduction in TMV of lead in soils above action levels at OU1.	Does not reduce toxicity or volume. May reduce mobility of lead by limiting the percolation of surface water through the lead-contaminated soils.
Degree to which treatment is reversible	Excavation and disposal is not reversible.	Cover is reversible. Cover may be removed and could utilize another technology at a later date.
Type and quantity of residuals remaining after treatment	No residuals left on excavated soils; however, soils greater than 1 foot in depth will still contain lead.	No residuals left within or above cover; however, soils beneath cover will still contain lead.
SHORT-TERM EFFECTIVENESS		
Protection of community during remedial action	Community not in vicinity of site; therefore, not affected during remedial action.	Community not in vicinity of site; therefore, not affected during remedial action.
Protection of workers during remedial action	Properly implemented Health and Safety program, dust control, and training will provide protection of workers.	Properly implemented Health and Safety program, dust control, and training will provide protection of workers.
Protection of recreational users if used as a public use facility	Excavation and disposal will provide short-term protection for recreational users.	Cover will provide short-term protection for recreational users.
Environmental impacts	No environmental impacts as a result of the remediation.	No environmental impacts as a result of the remediation.
Time until objectives are met	Expected to be completed in 6 months or less, once remediation begins.	Expected to be completed in 4 months or less, once remediation begins.

TABLE 3-4

DETAILED ANALYSIS OF CORRECTIVE MEASURE ALTERNATIVES FOR LEAD-CONTAMINATED SOILS

Evaluation Criterion	Alternative 1A Excavate and Dispose	Alternative 1B Cover
IMPLEMENTABILITY		
Ability to construct and operate the technology	Excavation and transportation to off-site disposal facility is easily completed.	Cover is easily completed.
Reliability of technology	Excavation and disposal is very reliable.	Case studies show that a cover is reliable.
Ability to monitor effectiveness	Effectiveness easily monitored with postconstruction soil monitoring program.	Effectiveness easily monitored with postconstruction soil monitoring program.
Availability of off-site TSDs and specialists	Iowa Waste, Douglas County Landfill	None required.
Availability of prospective technologies	Equipment and labor easily obtained locally.	Equipment and labor easily obtained locally.
COST		
Capital	$4,794,000	$1,018,000
O&M	$0	$15,525
Present Worth	$4,794,000	$1,179,000



PROPOSED EXCAVATION LIMITS FOR LEAD CONTAMINATED SOIL – ALTERNATIVE 1A

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY	TSSM	DATE	10/07/99	PROJECT NO.	FIG. NO.
CHK'D BY	JAW	REVISION	0	45-091MC204.02	3-1

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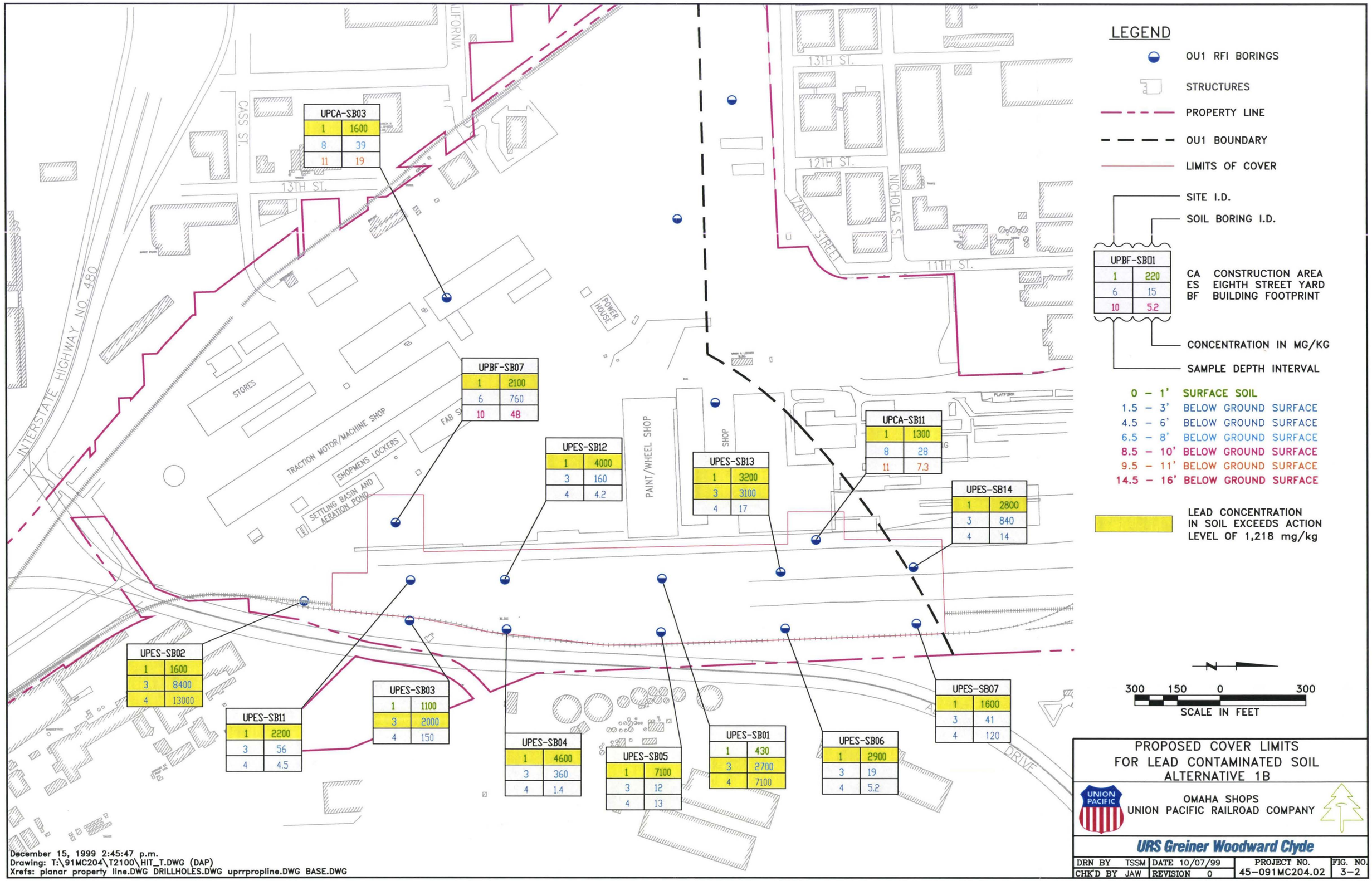

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PROPOSED COVER LIMITS FOR LEAD CONTAMINATED SOIL ALTERNATIVE 1B

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY	TSSM	DATE	10/07/99	PROJECT NO.	FIG. NO.
CHK'D BY	JAW	REVISION	0	45-091MC204.02	3-2

This section presents a conceptual design for the CM Alternative that includes a more thorough discussion of the design details, with some preliminary quantity estimates and O&M requirements. The conceptual design will also present some special considerations that may require consideration during the CM.

4.1 BASIS FOR CONCEPTUAL DESIGN

The CM consists of constructing a soil cover over lead-contaminated soil. The alternative was chosen for the following reasons:

- The alternative meets the CM objectives:
  - To reduce the potential for the current occupants, future construction workers, and recreational users to be exposed to site surface and shallow soils with lead levels in excess of 1,218 mg/kg
  - To reduce the potential for future construction workers performing intrusive work to come into contact with subsurface soils containing lead in excess of the levels mentioned above
  - To ensure the objectives mentioned above are still met after completion of future construction work
- The alternative is cost effective and can be readily implemented at the site.
- The alternative provides protection to construction workers, occupants, and trespassers of the public-use facility.
- The alternative provides protection if the facility is not developed.

4.2 DESCRIPTION OF CORRECTIVE MEASURE

The final CM to be applied to OU1 to address lead-contaminated soils will include some institutional controls that will provide some additional protection to potential future construction workers, trespassers, occupants, and recreational users, dependent upon the final development of the property after the CM has been completed. The individual elements of the final CM are discussed below.

4.2.1 Institutional Controls

The addition of institutional controls will provide an added measure of protection after the completion of the CM. Institutional controls may consist of legal, engineering, or other controls that limit the ability of human receptors to compromise the integrity of the completed remediation. Institutional controls may include, but not necessarily be limited to, the following:

- Land restrictions to include that the current landowner implement the O&M Manual when intrusive activities are planned in the covered area

- Restrictive covenants covering the contaminated areas during remediation to prevent contact with contaminants by trespassers and occupants until remedial activities have been completed
- Warning markers and fencing preventing access to the remediated areas

4.2.2 Soil Cover for Lead-Contaminated Soils

A cover over soils contaminated with lead has been determined to be an effective method of achieving the CM objectives for lead. The permeable cover will be utilized to minimize the likelihood of contact between humans and soils contaminated with lead, thus eliminating the exposure pathway. The cover will be comprised of a minimum depth of 12 inches and will be placed over all areas of OU1 that have lead contamination in excess of 1,218 mg/kg (Figure 4-1).

The samples collected during the adjacent ASARCO plant characterization indicate that total lead concentrations greater than 1,900 ppm tend to exceed TCLP criteria for lead. TCLP results tend to overestimate the mobility of lead in the environment. The potential to overestimate lead mobility is recognized by the USEPA and, as a result, a variation of the TCLP test, EPA Method 1312 (the SPLP test), is often used as a more representative estimate of the mobility of lead in the environment. The SPLP test is intended to better simulate leaching conditions as a result of precipitation percolating through the soil instead of simulation of leachate from a landfill. As a result, lead concentrations associated with SPLP are usually lower and will often pass when TCLP concentrations fail the lead testing criteria (Hydrometrics 1995).

The permeable cover will consist of a colored geotextile fabric laid over the contaminated areas. The purpose of the fabric is to provide a visual "warning" layer to construction workers to cease digging in the area. The geotextile will be overlain by a minimum of 12 inches of clean, low plastic, silty clay fill that will be acquired from a local borrow source. The fill will be capable of sustaining vegetative growth and will be graded to minimize ponding of precipitation on the surface of the cover. A typical cover cross section is presented in Figure 4-2.

4.3 OPERATION AND MAINTENANCE PROGRAM

After construction for the CM is complete, an O&M program will be implemented. The purpose of the O&M program is to maintain the integrity of the remediated areas. The primary procedures of the O&M program will include the following:

4.3.1 Cover System

The completed cover system will require regular inspection and maintenance to ensure that protection against exposure is still provided. The inspection and maintenance of the cover may include:

- Inspections to ensure the cover has not been disturbed, eroded, or otherwise compromised
- Routine mowing and trimming (this may be completed by the maintenance crew should the area be developed)

- Repairs to the cover due to erosion, burrowing animals, unauthorized traffic, or any other damage

4.4 DESIGN AND IMPLEMENTATION CONSIDERATIONS

The purpose of this section is to present some preliminary considerations that may require attention prior to or during construction and operation of the selected CM alternative. These items may include:

- Data gaps in the current RFI may require additional investigation within the areas of concern.
  - The solubility of lead at the site has not been determined.
  - The leachability of lead at the site by EPA Method 1312 – SPLP has not been determined.
  - The exact location of utility corridors and basements for any future development plans is not known and may affect the CM alternative.
- Provisions to protect workers during construction (i.e., dust control, air monitoring program, Health and Safety Plan etc.).
- Locating and decommissioning of utilities may be required.
- The legal and regulatory requirements to implement the institutional controls have not yet been defined.
- An adequate off-site borrow source for fill material will need to be identified and acquired.

If further investigation is required after the data has been validated and analyzed, the remaining concerns will be addressed and discussed in the Final CM Work Plan.

4.5 COSTS

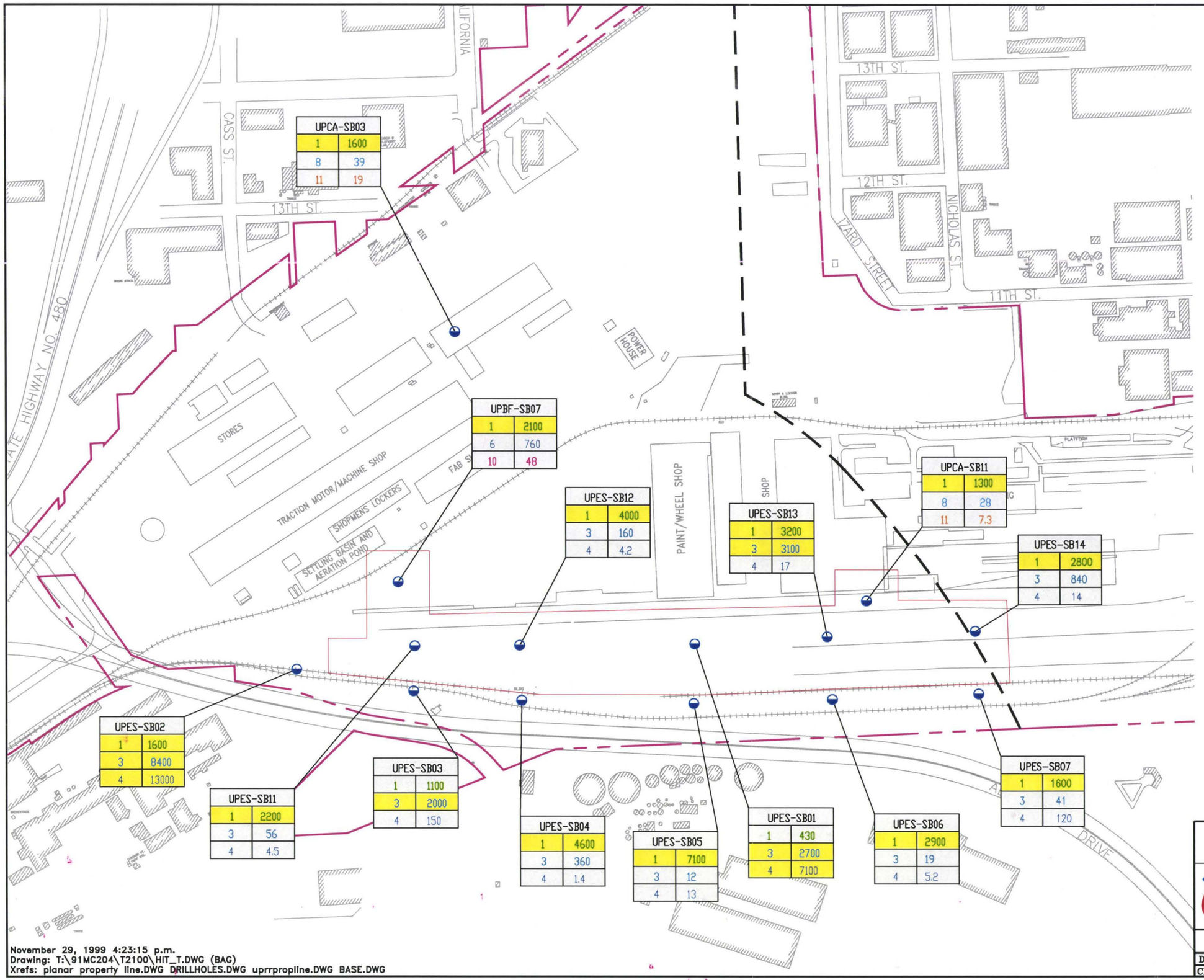
The CM alternative capital, O&M, and present worth costs are presented in Table 4-1. Detailed costs for O&M are presented in Table B-1B.2 of Appendix B. Estimated capital costs to complete the selected alternative are approximately $1.02 million. O&M costs are estimated at $15,500 for years 1 through 15, for a total of $1.18 million.

TABLE 4-1

SUMMARY OF TOTAL COSTS
FOR SELECTED ALTERNATIVE
UPRR - OMAHA SHOPS

Alternative:	1A - Lead-Contaminated Soils	Expected Accuracy Range:	+50% to -30%
Description:	Lead Cover, Dispose Asbestos/PCS	Present Worth Discount Rate:	7%
Site:	UPRR - Omaha Shops	Base Year of Estimate:	1999
Location:	Omaha, NE	Capital Cost Years:	0
Date Prepared:	December 22, 1999	O&M Cost Years:	1-15

DESCRIPTION	QTY	UNIT	UNIT COST	COST	TOTALS	NOTES
CAPITAL COSTS (YEAR 0):						
1. **Monitoring, Sampling, Testing, Analysis**						
a. Air Monitoring Station	2	LS	$750.00	$1,500		Includes calibrator
b. Air Sampling Cartridge Analysis	64	EA	$40.00	$2,560		One per day per unit.
c. Confirmation Sampling - Lead Soils	9	EA	$125.00	$1,125		1 sample / 5000 CY
SUBTOTAL				$5,185		
2. **Sitework**						
a. Institutional Controls	1	LS	$3,000.00	$3,000		
b. Site Clearing	17	AC	$1,000.00	$17,000		
SUBTOTAL				$20,000		
3. **On-Site Treatment (Lead Cover)**						
a. Geotextile Fabric	108,000	SY	$2.00	$216,000		
b. Borrow Fill, Spread, and Compact	43,200	CY	$10.00	$432,000		
SUBTOTAL				$648,000		
SUBTOTAL 1					$673,185	
Contingency (% of Subtotal 1)		35%		$235,615		20% scope + 15% bid
SUBTOTAL 2					$908,800	
Project Management and Support (% of Subtotal 2)						
a. Project Management		2%		$18,176		
b. Engineering / Design		6%		$54,528		
c. Construction Management		4%		$36,352		
SUBTOTAL				$109,056		
TOTAL CAPITAL COSTS - YEAR 0					$1,017,856	
TOTAL O&M COSTS - YEAR 1-15					$161,144	O&M for cover only. See Table B-1B.3
TOTAL PRESENT WORTH COSTS					$1,179,000	



LEGEND

- OU1 RFI BORINGS
- STRUCTURES
- PROPERTY LINE
- OU1 BOUNDARY
- LIMITS OF COVER

UPBF-SB01	
1	220
6	15
10	5.2

- SITE I.D.
- SOIL BORING I.D.
- CONCENTRATION IN MG/KG
- SAMPLE DEPTH INTERVAL

CA CONSTRUCTION AREA
ES EIGHTH STREET YARD
BF BUILDING FOOTPRINT

0 – 1' SURFACE SOIL
1.5 – 3' BELOW GROUND SURFACE
4.5 – 6' BELOW GROUND SURFACE
6.5 – 8' BELOW GROUND SURFACE
8.5 – 10' BELOW GROUND SURFACE
9.5 – 11' BELOW GROUND SURFACE
14.5 – 16' BELOW GROUND SURFACE

LEAD CONCENTRATION IN SOIL EXCEEDS ACTION LEVEL OF 1,218 mg/kg

AREA AROUND UPCA-SB03 WILL BE EXCAVATED AND DISPOSED DURING ASBESTOS INTERIM MEASURE.

N

300 150 0 300
SCALE IN FEET

PROPOSED COVER LIMITS FOR LEAD CONTAMINATED SOIL

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY TSSM	DATE 10/07/99	PROJECT NO.	FIG. NO.
CHK'D BY JAW	REVISION 0	45-091MC204.02	4-1

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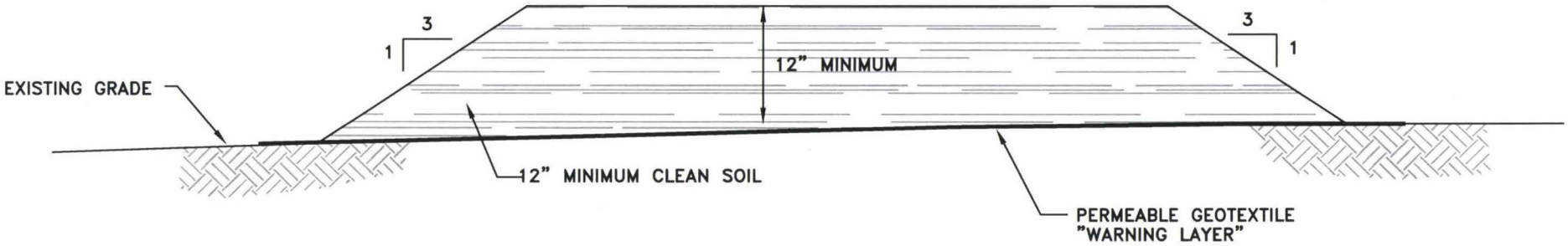

NOTES:

1. GEOTEXTILE LAYER TO BE COLORED. (YELLOW OR ORANGE)

SCALE: NTS

TYPICAL COVER DESIGN CROSS SECTION

OMAHA SHOPS
UNION PACIFIC RAILROAD COMPANY

URS Greiner Woodward Clyde

DRN BY TSSM	DATE 10/07/99	PROJECT NO.	FIG. NO.
CHK'D BY JAW	REVISION 0	45-091MC204.02	4-2

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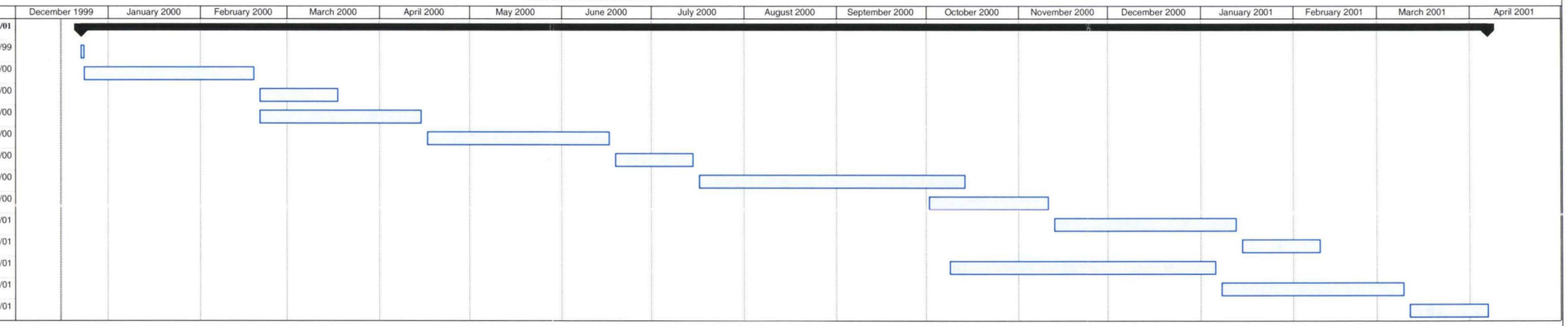
The schedule for implementation of the selected CM is shown on Figure 5-1.

FIGURE 5-1
PROPOSED UPRR OMAHA SHOPS
CMS WORK SCHEDULE

ID	Task Name	Duration	Start	Finish
1	**OU1CMS**	**471 days**	**Thu 12/23/99**	**Fri 4/6/01**
2	CMS Submittal	1 day	Thu 12/23/99	Thu 12/23/99
3	EPA Review	57 days	Fri 12/24/99	Fri 2/18/00
4	Final CMS	26 days	Mon 2/21/00	Fri 3/17/00
5	Draft CMI Work Plan	54 days	Mon 2/21/00	Fri 4/14/00
6	EPA Review	61 days	Mon 4/17/00	Fri 6/16/00
7	Final CMI Work Plan	26 days	Mon 6/19/00	Fri 7/14/00
8	CMI	89 days	Mon 7/17/00	Fri 10/13/00
9	Draft CMI Report	40 days	Mon 10/2/00	Fri 11/10/00
10	EPA Review	61 days	Mon 11/13/00	Fri 1/12/01
11	Final CMI Report	26 days	Mon 1/15/01	Fri 2/9/01
12	Draft CM Compl Rpt	89 days	Mon 10/9/00	Fri 1/5/01
13	EPA Review	61 days	Mon 1/8/01	Fri 3/9/01
14	Final CM Compl Rpt	26 days	Mon 3/12/01	Fri 4/6/01



Project: Pjsch5-1
Date: Thu 12/16/99

Task | Progress | Summary | Rolled Up Split | Rolled Up Progress | Project Summary
Split | Milestone | Rolled Up Task | Rolled Up Milestone | External Tasks

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REQUIREMENTS FOR IDENTIFICATION OF PROTECTION STANDARDS

The Order requires identification of protection standards in the RFI report, and they have been restated for the CMS report. This includes identification of "all relevant and applicable standards for the protection of human health and the environment (e.g., national Ambient Air Quality Standards, Federally approved state water quality standards, etc.)." While USEPA's RFI guidance requires consideration of other laws, regulations, and standards, no RCRA guidance for identification of relevant and applicable protection standards is available; therefore, guidance developed under CERCLA for identification of applicable or relevant and appropriate requirements (ARARs) was followed.

Identification of, and compliance with, ARARs is mandated by CERCLA (as amended by the Superfund Amendments and Reauthorization Act [SARA]) and by its implementing regulations, contained in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP 40 CFR Part 300). As part of the NCP's remedial investigation/feasibility study (RI/FS) process (which is somewhat analogous to the RCRA RFI/CMS process), remedial alternatives, including the no-action alternative, are evaluated to assess the degree to which they attain or exceed ARARs. This process is intended to provide a measure of the effectiveness of remedial alternatives in relation to protection of human health and the environment. A preliminary identification of potential ARARs during project scoping assists in initially identifying remedial action objectives and is useful for initiating communications and consultations with responsible agencies. ARAR identification continues throughout the RFI/CMS as a better understanding is gained of site conditions, site contaminants, exposure pathways, and remedial action alternatives.

ARARs include standards, requirements, criteria, or limitations established under Federal environmental law, or more stringent standards, requirements, criteria, or limitations promulgated (i.e., of general applicability and legally enforceable) in accordance with a State environmental statute.

"Applicable" standards are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State laws that specifically address a hazardous substance, contaminant, remedial action, or locational circumstance.

"Relevant and appropriate" standards are those that apply to circumstances sufficiently similar to those encountered at a CERCLA site that, although otherwise not legally required, their application would be appropriate at that specific site. If a requirement is found to be relevant and appropriate under the NCP, it will be treated in the same way as an applicable requirement.

"To be considered" standards (TBCs) are nonpromulgated advisories, proposed rules, criteria, or guidance documents issued by Federal or State governments that do not have the status of potential ARARs. These advisories and guidance are to be considered when determining protective cleanup levels where no ARAR exists, or where ARARs are not sufficiently protective of human health and the environment.

Based on EPA guidance (EPA 1988), ARARs are categorized as chemical-specific, action-specific, or location-specific:

Chemical-Specific ARARs. Chemical-specific ARARs include laws and requirements that establish levels that are considered protective of human health and the environment for specific chemicals in designated media. Chemical-specific ARARs regulate the discharge of residues if they are part of the remedial action. They are used to help determine the level of remediation and the allowable levels of residues following treatment. Maximum contaminant levels in the Safe Drinking Water Act are examples of chemical-specific ARAR.

Action-Specific ARARs. Action-specific ARARs are not established for a specific contaminant; rather, they define treatment and disposal activities for hazardous substances and control remedial actions to limit the release of hazardous substances to the environment during the action. Performance levels, actions, or remedial technologies may be established, as well as specific contaminant levels, for discharge of residues. Each action-specific requirement will differ depending on the remedial action objectives. Closure requirements under RCRA Subtitles C and D are examples of action-specific ARARs.

Location-Specific ARARs. Location-specific ARARs establish restrictions that are related to the geographic location of the site and surrounding areas, such as wetlands, sensitive habitats, floodplains, and historical places. The 100-year floodplain requirements of 40 CFR 264.18(b) is an example of a location-specific ARAR.

As a general rule, response actions that meet ARARs are effective in preventing or minimizing the release of contaminants, and thereby reduce present and future risk to public health and the environment.

PROTECTION STANDARDS

The analysis of protection standards/ARARs for the RFI and this CMS was completed in accordance with the following USEPA guidance documents:

- EPA/530/SW-89-031, Interim Final RCRA Facility Investigation (RFI) Guidance (OSWER Directive 9502.00-6D)
- EPA/540/G-89/004, Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA
- EPA/540/G-89/006, CERCLA Compliance with Other Laws Manual
- EPA/540/G-89/009, CERCLA Compliance with Other Laws Manual: Part II. Clean Air Act and Other Environmental Statutes and State Requirements

Comprehensive lists of chemical-specific, action-specific, and location-specific ARARs and TBCs are included in Tables A-1 through A-3 (the CERCLA terminology is used in the tables). The tables include comments regarding the applicability or relevance and appropriateness of a potential ARAR. Only those requirements that are judged to be applicable or relevant and appropriate will be carried forward for consideration at OU1 during future evaluation; however, this will require concurrence from the appropriate regulatory agency.

TABLE A-1

POTENTIAL CHEMICAL-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
Federal			
Solid Waste Disposal Act (SWDA), as amended	42 USCA Sect. 6901-6992K		
Identification and Listing of Hazardous Waste	40 CFR Part 261	Defines characteristics of hazardous wastes and provides lists of hazardous wastes. Identifies solid wastes that are subject to regulation as hazardous wastes under 40 CFR Parts 124, 262-265, 268, 270, and 271.	Applicable to wastes generated by remedial activities, including investigation-derived wastes, excavated soil, or solid wastes generated by treatment of soil or hazardous wastes. Relevant and appropriate for contaminated soil at the site.
RCRA Facility Investigation Guidance	EPA 1989	Guidance levels for cleanup of contaminated soils based on EPA-derived chronic exposure assumptions; intended as screening levels at RCRA facilities to determine if a more detailed health-risk evaluation is warranted.	TBC for detected soil contamination.
Corrective Action for Solid Waste Management Units (SWMUs) at Hazardous Waste Management Facilities (Proposed Rule)	55 FR 30798 27 July 1990	Risk-based action levels for contaminants in soil which, if exceeded, would trigger the need for a Corrective Measures Study.	TBC for detected soil contamination.
Clean Air Act (CAA), as amended	42 USCA Sect. 7401-7671Q		
National Primary and Secondary Ambient Air Quality Standards	40 CFR Part 50	Establishes ambient air quality standards for certain "criteria pollutants" to protect public health and welfare.	Applicable. Would be considered as part of a permit application for emissions of air pollutants from on-site treatment processes.
Standards of Performance for New Stationary Sources	40 CFR Part 60	Provides emission standards for certain industrial activities.	Relevant and appropriate if pollutants addressed by the regulations are emitted due to remedial actions at the site.

TABLE A-1

POTENTIAL CHEMICAL-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
National Emission Standards for Hazardous Air Pollutants	40 CFR Part 61	Provides standards for emissions of hazardous air pollutants from certain activities. Subpart M contains the National Emission Standard for Asbestos, and defines asbestos-containing waste materials and regulated asbestos containing materials (RACM).	Relevant and appropriate if pollutants addressed by NESHAPS are emitted due to remedial actions at the site that do not involve listed activities.
Residential Lead-Based Paint Hazard Reduction Act of 1992	P.L. 102-550		
Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (June 1995)		Establishes hazard levels for lead in bare soil: 2000 ppm (building perimeter and yard) and 400 ppm (high contact areas, such as playgrounds and gardens).	TBC for determining whether lead concentrations in soil present a hazard.
Toxic Substance Control Act (TSCA), as amended	7 U.S.C. Sect. 136 *et seq.*		
Identification of Dangerous Levels of Lead; Proposed Rule	63 FR 30301	Soil containing lead in excess of 2,000 ppm is defined as a soil lead hazard, for purposes of lead-based paint abatement activities.	TBC for determining whether lead concentrations in soil present a hazard.
Lead-Based Paint Poisoning Prevention In Certain Residential Structures	40 CFR 745	References clearance levels for lead-contaminated soil.	TBC for determining whether lead concentrations in soil present a hazard.
Asbestos-Containing Materials in Schools	40 CFR 763.83	Defines asbestos-containing material as any material or product which contains more than 1 percent asbestos	TBC for determining whether asbestos concentrations in soil present a hazard.

TABLE A-1

POTENTIAL CHEMICAL-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
State			
Nebraska Environmental Protection Act	Neb. Rev. Stat., Chapter 81	State's policy on environmental control.	
Rules and Regulations Governing Hazardous Waste Management in Nebraska	Neb. Adm. Rules & Regs., Title 128	Defines characteristics of hazardous wastes and provides lists of hazardous wastes. Identifies solid wastes which are subject to regulation as hazardous wastes.	Applicable to wastes generated by remedial activities, including investigation-derived wastes, excavated soil, or solid wastes generated by treatment of soil or hazardous wastes.
Ground Water Quality Standards and Use Classification	Neb. Adm. Rules & Regs., Title 118	Addresses investigation and cleanup of petroleum contamination. Proposed risk-based corrective action (RBCA) regulations will define action levels.	TBC for petroleum-contaminated soil on site.
Air Pollution Control Rules and Regulations	Neb. Adm. Rules & Regs., Title 129, Chapter 4	Establishes Primary and Secondary Ambient Air Quality Standards for particulate matter, sulfur dioxide, carbon monoxide, ozone, and lead.	Applicable if regulated pollutants (e.g. particulates) are discharged to the atmosphere during remedial action.
	Neb. Adm. Rules & Regs., Title 129, Chapter 5	Establishes criteria for obtaining a permit to operate a source of potential emissions of hazardous air pollutants, volatile organic compounds, and particulate matter.	May be applicable for alternatives involving emissions of regulated pollutants from treatment processes.
	Neb. Adm. Rules & Regs., Title 129, Chapter 17	Establishes criteria for obtaining a permit to construct or modify a source of potential emissions of hazardous air pollutants, volatile organic compounds, and particulate matter.	May be applicable for alternatives involving emissions of regulated pollutants from treatment processes.

TABLE A-1

POTENTIAL CHEMICAL-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
	Neb. Adm. Rules & Regs., Title 129, Chapter 19	Adopts 40 CFR Sect. 52.21 regarding Prevention of Significant Deterioration of Air Quality.	Applicable. Would be considered as part of the process for establishing emissions limitations of air pollutants from on-site treatment processes (e.g., incineration).
	Neb. Adm. Rules & Regs., Title 129, Chapter 23, Hazardous Air Pollutants: Emission Standards	Adopts 40 CFR 61 (NESHAPS).	Relevant and appropriate if pollutants addressed by NESHAPS are emitted due to remedial actions at the site that do not involve listed activities.
	Neb. Adm. Rules & Regs., Title 129, Chapter 32	Prohibits visible emissions of fugitive particulate matter beyond the premises where it originates.	Applicable if remedial activities, such as soil excavation, generate fugitive dust.
Asbestos Control Act	Nebraska Revised Statutes, §§71-6301 to 71-6317		
Regulations and Standards Governing Asbestos Projects	Nebraska Department of Health Regulations, Title 178, Chapter 22	Defines asbestos containing materials as any material or product containing over 1% asbestos.	Relevant and appropriate if remediation activities involve soil or other materials containing greater than 1% asbestos.

Guidance on Residential Lead-Based Paint, Lead-Contaminated Dust, and Lead Contaminated Soil

TABLE A-2

POTENTIAL ACTION-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
Federal			
Solid Waste Disposal Act (SWDA), as amended	42 USCA Sect. 6901-6992K		
Criteria for Classification of Solid Waste Disposal Facilities and Practices (Subtitle D)	40 CFR Part 257	Establishes criteria for use in determining which solid waste disposal facilities and practices pose a reasonable probability of adverse effects on health, and thereby constitute prohibited open dumps.	Relevant and appropriate for on-site closure of contaminated soils.
Criteria for Municipal Waste Landfills (Subtitle D)	40 CFR Part 258	Sets forth minimum criteria for municipal solid waste landfills, including design, operation, monitoring, corrective action, closure, and post-closure care requirements.	Corrective action and closure requirements are relevant and appropriate, although the Subtitle C requirements listed below are more stringent.
Hazardous Waste Management Systems General (Subtitle C)	40 CFR Part 260	Provides definitions, general standards, and information applicable to 40 CFR Parts 260-265, 268.	Applicable for remedial actions that involve management of hazardous waste, such as contaminated debris or investigation-derived waste.
Identification and Listing of Hazardous Wastes (Subtitle C)	40 CFR Part 261	Defines those solid wastes which are subject to regulations as hazardous wastes under 40 CFR Parts 262-265 and Parts 124, 270, and 271.	Applicable for remedial actions that involve the need to determine whether hazardous wastes, such as contaminated debris or investigation-derived waste, are being managed on-site.
Standards Applicable to Generators of Hazardous Waste (Subtitle C)	40 CFR Part 262	Establishes standards for generators of hazardous waste.	Applicable for remedial actions that involve off-site disposal or treatment of hazardous waste. On-site generation triggers selected provisions (i.e., waste determination, accumulation time).

TABLE A-2

POTENTIAL ACTION-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
Standards Applicable to Transporters of Hazardous Waste (Subtitle C)	40 CFR Part 263	Establishes standards that apply to transporting hazardous waste within the U.S. if the transportation requires a manifest under 40 CFR Part 262.	Applicable for remedial actions that involve off-site transportation of hazardous waste, such as contaminated debris or investigation-derived waste.
Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (Subtitle C)	40 CFR Part 264	Establishes minimum national standards that define the acceptable management of hazardous waste for owners and operators of facilities which treat, store, or dispose of hazardous waste.	Applicable for remedial actions that involve on-site treatment or disposal of hazardous waste.
	40 CFR 264.111	Establishes performance standards for closure of permitted facilities. Closure must minimize the need for further maintenance, and control, minimize or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere	Relevant and appropriate for site closure.
	40 CFR 264, Subpart S	Addresses corrective action at solid waste management units (SWMUs). Establishes requirements for corrective action management units (CAMUs) and temporary units (TUs) for management of remediation wastes during remediation activities.	Applicable if containerized or un-containerized remediation wastes, such as excavated soil, would be managed (treated, stored, or disposed) on site. These regulations waive some of the procedural and technical requirements that would otherwise apply to a new SWMU.

TABLE A-2

POTENTIAL ACTION-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
Interim Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities (Subtitle C)	40 CFR Part 265	Establishes minimum national standards that define the acceptable management of hazardous waste during the period of interim status and until certification of final closure or if the facility is subject to post-closure requirements, until post-closure responsibilities are fulfilled.	Relevant and appropriate, but less stringent than the Part 264 standards.
Land Disposal	40 CFR Part 268	Identifies hazardous wastes restricted from land disposal and treatment standards for restricted wastes and waste treatment residuals.	Relevant and appropriate if closure of the site involves on-site closure of contaminated soils.
Hazardous Waste Permit Program	40 CFR Part 270	Establishes provisions covering basic EPA permitting requirements.	Not an ARAR. No RCRA Subtitle C permit is required for closure of the site.
Underground Storage Tanks	40 CFR Part 280 RCRA Subtitle I	Establishes regulations for underground storage tanks used to contain petroleum or other regulated substances (as defined at 40 CFR 280.12). Includes requirements for site investigations and corrective action plans.	Relevant and appropriate for corrective actions addressing petroleum-contaminated soil.
Safe Drinking Water Act	42 USCA Sect. 300(f) et seq.		
Standards for Owners and Operators of Public Water Supply System	40 CFR Part 141	Establishes primary drinking water regulations, including treatment (water quality) requirements for public water supply systems.	Not an ARAR or TBC.
Underground Injection Control Regulations	40 CFR Parts 144-147	Establishes permitting requirements for injection wells to provide for protection of underground sources of drinking water.	Not an ARAR or TBC.

TABLE A-2

POTENTIAL ACTION-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
Clean Water Act	33 USCA Sect. 1251-1376		
National Pollutant Discharge Elimination System	40 CFR Parts 122, 125	Requires permits for the discharge of pollutants from any point source into waters of the United States.	Not an ARAR. Potential remedies do not involve discharge from treatment systems.
	40 CFR Sect. 122.26(b)(14)(x)[1]	Requires that storm water runoff be monitored and controlled on construction sites greater than five acres.	Applicable if the remediation site is greater than five acres, relevant and appropriate for smaller sites.
National Pretreatment Standards	40 CFR Part 403	Sets pretreatment standards to control pollutants that pass through or interfere with treatment processes in publicly owned treatment works (POTW) or which may contaminate sewage sludge.	Not an ARAR. Potential remedies do not involve discharge to a POTW.
Marine Protection Research, and Sanctuaries Act of 1972	16 USCA Sect. 1431-1445 33 USCA Sect. 1401-1445, 1447	Regulates ocean dumping.	Not an ARAR. Remedial action will not involve ocean dumping.
Residential Lead-Based Paint Hazard Reduction Act of 1992	P.L. 102-550		
Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (June 1995)		Establishes recommended abatement or interim control measures for lead-contaminated soil: >2000 ppm (building perimeter and yard) and >400 ppm (high contact areas, such as playgrounds and gardens).	TBC for determining the appropriate response actions where lead-contaminated soil is present.
Toxic Substances Control Act (TSCA)	15 USCA Sect. 2601-2692		
Lead-Based Paint Poisoning Prevention In Certain Residential Structures	40 CFR 745	Includes requirements for abatement of lead-contaminated soil.	Relevant and appropriate for abatement of lead-contaminated soil.

TABLE A-2

POTENTIAL ACTION-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, And Use Prohibitions	40 CFR Part 761	Establishes storage and disposal requirements for PCBs.	Not an ARAR. Remedial action will not involve handling of PCBs.
Asbestos	40 CFR Part 763	Establishes requirements for inspection of asbestos containing materials and abatement, if necessary, in elementary or secondary school buildings. Includes requirements for transport and disposal of asbestos-containing wastes.	Relevant and appropriate for management of asbestos-contaminated soil and debris.
	15 USCA Sect. 2669	Establishes requirements for radon studies and abatement, including federal buildings.	Not an ARAR. Remedial action will not involve radon.
Clean Air Act (CAA), as amended	42 USCA Sect. 7401-7671Q		
Approval and Promulgation of Implementation Plans	40 CFR 52, Subpart CC, Nebraska	Establishes Air Quality Control Regions and attainment dates for national standards in those regions.	Applicable if remedial activities involve air emissions, e.g., excavation.
New Source Performance Standard, Municipal Solid Waste Landfills	40 CFR Part 60, Subpart WWW	Rule for control of non-methane organic compounds (NMOC's) from municipal solid waste landfills emitting > 167 TPY NMOC's and with maximum design capacity of ≥ 111,000 T.	Relevant and appropriate for alternatives that propose leaving petroleum-contaminated soil on-site.

TABLE A-2

POTENTIAL ACTION-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
National Emission Standards for Hazardous Air Pollutants	40 CFR Part 61	Provides standards for emissions of hazardous air pollutants from certain activities. Subpart M contains the National Emission Standard for Asbestos, and defines asbestos-containing waste materials and regulated asbestos containing materials (RACM). Contains requirements for asbestos disposal procedures and for asbestos disposal sites.	Applicable if a listed activity, such as a demolition or renovation project involving asbestos is carried out. Relevant and appropriate for activities involving excavation of asbestos-containing waste. Relevant and appropriate if pollutants addressed by NESHAPS are emitted due to remedial actions at the site that do not involve listed activities.
Hazardous Materials Transportation Act	40 USCA Sect. 1801-1813		
Hazardous Materials Transportation Regulations	49 CFR Parts 107, 171-177	Regulates transportation of hazardous materials.	Applicable for remedial actions that involve off-site transportation of hazardous materials.
Occupation Safety and Health Act of 1970	PL 91-596 29 USCA Sect. 651-678		
Occupational Safety and Health Standards	29 CFR Part 1910	Establishes safety and health requirements for personnel working with hazardous materials and hazardous waste.	Applicable to on-site remedial activities.
Safety and Health Regulations for Construction	29 CFR Part 1926	Establishes protection standards (e.g., hazard communication, excavation and trenching requirements) for workers involved in hazardous waste operations.	Applicable to on-site remedial activities.
<u>State</u>			
Nebraska Environmental Protection Act	Neb. Rev. Stat., Chapter 81 Article 15		
Nebraska Surface Water Quality Standards	Nebr. Adm. Rules & Regs., Title 117	Establishes water quality standards and criteria for the surface waters of the state.	Applicable if contaminants leach from the soil to surface waters.

TABLE A-2

POTENTIAL ACTION-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
Ground Water Quality Standards and Use Classification	Neb. Adm. Rules & Regs., Title 118	Provides groundwater remedial actions protocol for point source groundwater pollution; defines Remedial Action Classes (RACs) with basic requirements for remedial action. Proposed risk-based corrective action (RBCA) regulations will define action levels.	Not an ARAR. This operable unit does not include groundwater pollution. RBCA remedial action requirements for petroleum-contaminated soil are TBC.
Petroleum Contaminated Soils Protocol for the Leaking Underground Storage Tank Program	(not promulgated as a regulation)	Provides guidance for soil investigation and cleanup at LUST sites.	TBC for corrective actions addressing petroleum-contaminated soil.
Rules and Regulations Pertaining to the Issuance of Permits under the NPDES	Neb. Adm. Rules & Regs., Title 119	Requires permit for discharging pollutants from a point source into the waters of the State.	Not an ARAR. Site activities will not involve point source discharges to surface water.
Effluent Guidelines and Standards	Neb. Adm. Rules & Regs., Title 121	Establishes point source effluent standards and secondary treatment standards for industries.	Not an ARAR. Site activities will not involve point source discharges to surface water.
Rules and Regulations for Underground Injection and Mineral Production Wells	Neb. Adm. Rules & Regs., Title 122	Establishes procedures for permitting underground injection of hazardous wastes into or above an underground supply of drinking water.	Not an ARAR. Site activities will not involve alternatives proposing reinjection of treated groundwater.
Design, Operation, and Maintenance of Wastewater Treatment Facilities	Neb. Adm. Rules & Regs., Title 123	Establishes procedures for the design, operation, and maintenance of wastewater treatment works, including the submittal of plans, receipt of construction permits, and construction and testing requirements.	Not an ARAR. Site activities will not involve on-site treatment of extracted groundwater.

TABLE A-2

POTENTIAL ACTION-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
Design, Operation, and Maintenance of Septic Tanks	Neb. Adm. Rules & Regs., Title 124	Establishes procedures for the design, operation, and maintenance of septic tank systems including permitting, design criteria, testing, site layout, construction, maintenance, allowable waste types and abandonment.	Not an ARAR. Remedial action will not involve septic tanks.
Design, Operation, and Maintenance of Individual Waste Treatment Lagoons	Neb. Adm. Rules & Regs., Title 125	Establishes design, operation, and maintenance criteria for wastewater lagoons including design, construction, operation and maintenance.	Not an ARAR. Remedial action will not involve wastewater lagoons.
Rules and Regulations Pertaining to the Management of Wastes	Neb. Adm. Rules & Regs., Title 126	Requires permits for licenses for various waste management activities and establishes policy for releases of oil or hazardous substances and remediation of such releases.	Relevant and appropriate. Substantive requirements for spills/releases and remediation of spills/releases are given in Title 118 and Title 128.
Rules and Regulations Governing the Nebraska Pretreatment Program	Neb. Adm. Rules & Regs., Title 127	Establishes limitations on types of wastes which can be discharged to a POTW and requires a permit when a discharge may interfere with, pass through, or be incompatible with a POTW's treatment process.	Not an ARAR. Site activities will not involve discharges of contaminated groundwater to a POTW.
Rules and Regulations Governing Hazardous Waste Management in Nebraska	Neb. Adm. Rules & Regs., Title 128	Establishes procedures for notification of hazardous waste activity, identification and listing of hazardous wastes, generators, and operators of treatment, storage, and disposal facilities.	Substantive requirements that are the same or more stringent than 40 CFR 261, 262, 263, 264, 268, 270 are applicable.

TABLE A-2

POTENTIAL ACTION-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
Air Pollution Control Rules and Regulations	Neb. Adm. Rules & Regs., Title 129, Chapter 2	Defines "major source" of hazardous air pollutants and major stationary sources of other pollutants, including fugitive dust and other particulate emissions.	Applicable to remedial activities generating fugitive dust, and potentially applicable to remedial alternatives involving volatilization or incineration.
	Neb. Adm. Rules & Regs., Title 129, Chapter 5	Establishes criteria for obtaining a permit to operate a source of potential emissions of hazardous air pollutants, volatile organic compounds, and particulate matter.	Substantive requirements are potentially applicable to remedial alternatives involving volatilization or excavation.
	Neb. Adm. Rules & Regs., Title 129, Chapter 22	Establishes emission limits for new incinerators and lists emission report contents.	Not an ARAR. Site activities will not involve incineration of hazardous wastes.
	Neb. Adm. Rules & Regs., Title 129, Chapter 16	Requires good engineering practice in design of the stack height.	Not an ARAR. Site activities will not involve incineration of hazardous wastes.
	Neb. Adm. Rules & Regs., Title 129, Chapter 17	Establishes criteria for obtaining a permit to construct or modify a source of potential emissions of hazardous air pollutants, volatile organic compounds, and particulate matter.	Substantive requirements are applicable to remedial alternatives involving volatilization or excavation.
	Neb. Adm. Rules & Regs., Title 129, Chapter 20	Prohibits visible dust beyond the limits of the property line where handling, transportation, or construction is taking place.	Applicable to remedial activities generating fugitive dust.
	Neb. Adm. Rules & Regs., Title 129, Chapter 39	Limits visible emissions from diesel-powered vehicles on public streets or highways.	Applicable only when diesel-powered vehicles used during remedial activities are on public streets or highways.
Rules and Regulations Pertaining to Solid Waste Management	Neb. Adm. Rules & Regs., Title 132	Establishes policy for licensing, locating, constructing, operating, and closing of solid waste facilities.	Applicable for alternatives involving the on-site disposal/closure of treated waste or soil.

TABLE A-2

POTENTIAL ACTION-SPECIFIC ARARs/TBCs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criterion, or Limitation	Citation	Description	Comment
Rules and Regulations Concerning Underground Storage Tanks in the State of Nebraska, State Fire Marshall's Office	Neb. Adm. Rules & Regs., Title 159	Applies to the operation, maintenance, installation, closure on use of underground tanks containing petroleum products and hazardous substances not classified as hazardous waste under RCRA Subtitle C.	Relevant and appropriate for corrective actions addressing petroleum-contaminated soil.
Regulations Governing Licensure of Water Well and Pump Installation Contractors and Certification of Water Well Drilling, Pump Installation, and Water Well Monitoring Supervisors[1]	Neb. Adm. Rules & Regs., Title 178, Chapter 10	Contains rules governing the qualifications of contractors installing water wells.	Not an ARAR. Site activities will not involve installation of monitoring wells, extraction of recovery wells, and the installation of pumps.
Regulations Governing Water Well Construction, Pump Installation, and Water Well Abandonment Standards	Neb. Adm. Rules & Regs., Title 178, Chapter 12	Contains rules governing water well construction and abandonment and pump installation.	Not an ARAR. Site activities will not involve installation of monitoring wells, extraction of recovery wells, and the installation of pumps.

TABLE A-3

POTENTIAL LOCATION-SPECIFIC ARARs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comments
Federal			
Floodplain Management	Executive Order 11988 40 CFR Part 6, Appendix A and 40 CFR Part 6.302	Limits activities in a floodplain, which is defined as "the lowland and relatively flat areas adjoining inland and coastal waters including at a minimum that area subject to a 1 percent or greater chance of flooding in any given year" (the 100-year floodplain)	TBC. The site is located in the 100-year floodplain, although it is protected from the 100-year flood by a levee.
Protection of Wetlands	Executive Order 11990 40 CFR Part 6, Appendix A	Addresses possible impacts of construction of facilities or management of property in wetlands; must avoid adverse effects, minimize potential harm, and preserve and enhance wetlands, to the extent possible.	Not an ARAR. No designated wetlands occur at proposed on-site remedial action locations.
Safe Drinking Water Act	42 USCA 300f et seq.		
Underground Injection Control Program: Criteria and Standards	40 CFR Part 146	Sets criteria for underground injection wells, including those used to inject treated wastes from RCRA or CERCLA cleanup actions. These regulations address how close injection wells may be placed to underground sources of drinking water.	Not an ARAR. No injection of treated wastes is proposed at this site.
Sole Source Aquifers	40 CFR Part 149	Includes regulations for defining sole or principal drinking water source aquifers	Not an ARAR. No sole source aquifer has been designated in this area.
Wellhead Protection Program	42 USCA 300h-7	1986 SDWA amendments direct States to implement programs to protect wells and recharge areas for drinking water wells.	Not an ARAR. No wellhead protection areas are located in this area.

TABLE A-3

POTENTIAL LOCATION-SPECIFIC ARARs
UNION PACIFIC RAILROAD OMAHA SHOPS, OPERABLE UNIT 1 (Continued)

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comments
Native American Graves Protection and Repatriation Act[1]	PL 101-601	Requires that if Native American remains or cultural items are found on federal lands, the appropriate tribe must be notified, and all activity in the area of discovery must cease for at least 30 days.	Applicable if Native American remains or cultural items are found during remedial activities.
Antiquities Act of 1906[1]	16 USCA 431-433 43 CFR Part 3	Provides for protection of historic and prehistoric ruins and objects on Federal lands.	Applicable if historical ruins or objects are found during remedial activities.
State			
Nebraska Endangered & Threatened Species Regulations	Neb. Adm. Rules & Regs., Title 163, Chapter 6	Regulations developed under the Nongame and Endangered Species Conservation Act, governing the protection, conservation and management of endangered and threatened wildlife species.	Not an ARAR. No state-listed species are present on the site or will be adversely affected.
Nebraska Human Burial Sites Act	Neb. Rev. Stat., Article 12, Sections 12-1201 to 1212.	Provides protection for unmarked human burial sites on private and public lands.	Not an ARAR. No human burial sites are located on site.
Nebraska Environmental Protection Act	Neb. Rev. Stat., Chapter 81		
Nebraska Air Pollution Control Rules and Regulations	Neb. Adm. Rules & Regs., Title 129, Chapter 3	Establishes air quality control regions, upon which determinations of attainment of National Ambient Air Quality Standards (NAAQS) are based. The site is located in the Omaha-Council Bluffs Interstate Air Quality Control Region.	Applicable to remedial activities generating emissions of regulated pollutants.

COST ESTIMATE METHODOLOGY

The information presented in these cost estimates is used to compare alternatives. Unit prices and general cost information were obtained from cost estimating references (R.S. Means 1999), cost estimates for similar work, vendor quotes, guidance documents, and engineering judgment.

Corrective measure cost estimates are intended to provide an accuracy range of –30 to +50 percent of actual cost. The actual project cost will depend on actual labor and material cost, productivity, competitive market conditions, actual project scope and schedule, and other variable factors. As a result of these factors, the actual project cost is likely to vary from the estimates provided in this study. Funding needs should be carefully evaluated, taking these factors into consideration before budgets are established.

Costs include capital costs, operation and maintenance costs, and total present worth cost of each corrective measure alternative.

Capital Costs

Capital costs are expenditures required to construct or install the corrective action. Capital costs include only the expenditures that are initially incurred to implement an action and major expenditures in future years. They do not include the costs required to operate and maintain the action throughout its lifetime.

Operation and Maintenance Costs

O&M costs are the post-constructive/installation costs necessary to ensure or verify the continued effectiveness of a corrective action. They include all labor, equipment, and material costs associated with activities such as monitoring, operating, and maintaining extraction, containment, or treatment systems and disposal of residuals.

Other Costs

Other costs that were added to capital and O&M costs are contingencies and professional/ technical support. Contingencies cover unknowns, unforeseen circumstances, or unanticipated conditions that cannot be determined from the known data. The two types of contingencies are scope and bid. Scope contingencies cover costs due to scope changes that may occur during design. Bid contingencies cover unknown costs associated with constructing or implementing the project scope.

Professional/technical support are nonconstruction or implementation costs that do not fall under any one line item cost. They include costs associated with project management, legal services, engineering design, construction management, and all other professional/technical services needed to support the action.

Present Worth Cost

Present worth is the amount of money needed in the base year to cover the future costs associated with a particular time period at a particular interest or discount rate. Computation of present worth allows for the evaluation and comparison of future costs discounted to a base year. For this estimate, a discount rate of 7 percent was used. The base year for the estimate is 1999.

TABLE B-1

SUMMARY OF COSTS FOR LEAD-CONTAMINATED SOILS
UPRR - OMAHA SHOPS

	Alternative 1A	Alternative 1B
	Excavate and Dispose Lead-Contaminated Soil	Cover Lead-Contaminated Soil
Capital Costs	$4,794,340	$1,017,856
Annual O&M Costs	$0	$15,525
O&M Years	0	15
Total Present Worth Costs	$4,794,340	$1,179,000

TABLE B-1A.1

SUMMARY OF CAPITAL COSTS
ALTERNATIVE 1A - EXCAVATE AND DISPOSE
UPRR - OMAHA SHOPS

Alternative:	1A - Lead-Contaminated Soils	Expected Accuracy Range:	+50% to -30%
Description:	Excavate and Dispose - Douglas County	Present Worth Discount Rate:	7%
Site:	UPRR - Omaha Shops	Base Year of Estimate:	1999
Location:	Omaha, NE	Capital Cost Years:	0
Date Prepared:	December 22, 1999	O&M Cost Years:	N/A

DESCRIPTION	QTY	UNIT	UNIT COST	COST	TOTALS	NOTES
CAPITAL COSTS (YEAR 0):						
1. **Monitoring, Sampling, Testing, Analysis**						
a. Confirmation Sampling - Lead Soils	8	EA	$125.00	$1,000		1 sample / 5000 cy
b. Air Monitoring Station (includes calibrator)	2	LS	$750.00	$1,500		Two month rent
c. Air Sampling Cartridge Analysis	64	EA	$40.00	$2,560		One per day per unit
SUBTOTAL				$5,060		
2. **Main Sitework**						
a. Institutional Controls	1	LS	$3,000.00	$3,000		
b. Site Preparation	1	LS	$2,000.00	$2,000		Fencing, Outhouse, Parking, Erosion Cont.
c. Excavate Lead Contaminated Soil	36,000	CY	$3.00	$108,000		Excavate top 12" only
d. Borrow, Spread, and Compact	43,200	CY	$10.00	$432,000		Includes mob/demob per vendor quote
SUBTOTAL				$545,000		
3. **Off-Site Treatment / Disposal (Lead)**						
a. Saturate Soil	46,800	TON	$1.00	$46,800		
b. Load and Haul	46,800	TON	$15.00	$702,000		
c. Landfill Disposal	46,800	TON	$40.00	$1,872,000		Douglas County Landfill
SUBTOTAL				$2,620,800		
SUBTOTAL 1					$3,170,860	
Contingency (% of Subtotal 1)		35%		$1,109,801		20% scope + 15% bid
SUBTOTAL 2					$4,280,661	
Project Management and Support (% of Subtotal 2)						
a. Project Management		2%		$85,613		
b. Engineering / Design		6%		$256,840		
c. Construction Management		4%		$171,226		
SUBTOTAL				$513,679		
TOTAL COSTS					$4,794,340	

TABLE B-1A.2

SUMMARY OF OPERATION AND MAINTENANCE COSTS
ALTERNATIVE 1A - EXCAVATE AND DISPOSE
UPRR - OMAHA SHOPS

Alternative ID:	1A - Lead-Contaminated Soils	Expected Accuracy Range:	+50% to -30% (feasibility study)
Description:	Excavate and Dispose - Douglas County	Present Worth Discount Rate:	7%
Site ID:	UPRR - Omaha Shops	Base Year of Estimate:	1999
Location:	Omaha, NE	Capital Cost Years:	0
Date Prepared:	December 22, 1999	O&M Cost Years:	N/A

DESCRIPTION	QTY	UNIT	UNIT COST	COST	TOTALS	NOTES
ANNUAL O&M COSTS (YEARS 1-30):						
1. **Site Maintenance**						
a. N/A	0			$0		No O&M associated with this alternative
				$0		
SUBTOTAL 1					$0	
Contingency (% of Annual O&M Cost Subtotal)		35%		$0		20% scope + 15% bid
SUBTOTAL 2					$0	
Project Management and Support (% of Subtotal 2)						
a. Project Management		5%		$0		
b. Technical Support		10%		$0		
SUBTOTAL				$0		
TOTAL ANNUAL O&M COST (YEARS 2-15)					$0	

TABLE B-1A.3

SUMMARY OF PRESENT WORTH COSTS
ALTERNATIVE 1A - EXCAVATE AND DISPOSE
UPRR - OMAHA SHOPS

Alternative ID:	1A - Lead Contaminated Soils	Expected Accuracy Range:	+50% to -30% (feasibility study)
Description:	Excavate and Dispose - Douglas County	Present Worth Discount Rate:	7%
Site ID:	UPRR - Omaha Shops	Base Year of Estimate:	1999
Location:	Omaha, NE	Capital Cost Years:	0
Date Prepared:	December 22, 1999	O&M Cost Years:	n/a

YEAR	CAPITAL COST	ANNUAL O&M COST	TOTAL COST	DISCOUNT FACTOR (7%)	PRESENT WORTH	CUMULATIVE PRESENT WORTH
0	$4,794,340		$4,794,340	1.000	$4,794,340	$4,794,340
TOTALS	$4,794,340	$0	$4,794,340		$4,794,340	
TOTAL PRESENT WORTH COST					**$4,794,340**	

TABLE B-1B.1

SUMMARY OF CAPITAL COSTS
ALTERNATIVE 1B - COVER
UPRR - OMAHA SHOPS

Alternative:	1C - Lead-Contaminated Soils	Expected Accuracy Range:	+50% to -30% (feasibility study)
Description:	Cover	Present Worth Discount Rate:	7%
Site:	UPRR - Omaha Shops	Base Year of Estimate:	1999
Location:	Omaha, NE	Capital Cost Years:	0
Date Prepared:	December 22, 1999	O&M Cost Years:	1-15

DESCRIPTION	QTY	UNIT	UNIT COST	COST	TOTALS	NOTES
CAPITAL COSTS (YEAR 0):						
1. **Monitoring, Sampling, Testing, Analysis**						
a. Confirmation Sampling - Lead Soils	9	EA	$125.00	$1,125		1 sample / 5000 CY
b. Air Monitoring Station (includes calibrator)	2	LS	$750.00	$1,500		Two month rent
c. Air Sampling Cartridge Analysis	64	EA	$40.00	$2,560		One per day per unit
SUBTOTAL				$5,185		
2. **Sitework**						
a. Institutional Controls	1	LS	$3,000.00	$3,000		
b. Site Clearing Preparation	17	AC	$1,000.00	$17,000		
SUBTOTAL				$20,000		
3. **On-Site Treatment (Cover)**						
a. Geotextile Fabric	108,000	SY	$2.00	$216,000		
b. Borrow Fill, Spread, and Compact	43,200	CY	$10.00	$432,000		
SUBTOTAL				$648,000		
SUBTOTAL 1					$673,185	
Contingency (% of Subtotal 1)		35%		$235,615		20% scope + 15% bid
SUBTOTAL 2					$908,800	
Project Management and Support (% of Subtotal 2)						
a. Project Management		2%		$18,176		
b. Engineering / Design		6%		$54,528		
c. Construction Management		4%		$36,352		
SUBTOTAL				$109,056		
TOTAL CAPITAL COST - YEAR 0					$1,017,856	

TABLE B-1B.2

SUMMARY OF OPERATION AND MAINTENANCE COSTS
ALTERNATIVE 1B - COVER
UPRR - OMAHA SHOPS

Alternative ID:	1C - Lead-Contaminated Soils	Expected Accuracy Range:	+50% to -30% (feasibility study)
Description:	Cover	Present Worth Discount Rate:	7%
Site ID:	UPRR - Omaha Shops	Base Year of Estimate:	1999
Location:	Omaha, NE	Capital Cost Years:	0
Date Prepared:	December 22, 1999	O&M Cost Years:	1-15

DESCRIPTION	QTY	UNIT	UNIT COST	COST	TOTALS	NOTES
ANNUAL O&M COSTS (YEARS 1-15):						
1. **Site Maintenance**						
a. Site & Cover Maintenance	200	HR	$50.00	$10,000		Approximately 16 hr/mo
				$10,000		
SUBTOTAL 1					$10,000	
Contingency (% of Annual O&M Cost Subtotal)		35%		$3,500		20% scope + 15% bid
SUBTOTAL 2					$13,500	
Project Management and Support (% of Subtotal 2)						
a. Project Management		5%		$675		
b. Technical Support		10%		$1,350		
SUBTOTAL				$2,025		
TOTAL ANNUAL O&M COST (YEARS 2-15)					**$15,525**	

TABLE B-1B.3

SUMMARY OF PRESENT WORTH COSTS
ALTERNATIVE 1B - COVER
UPRR - OMAHA SHOPS

Alternative ID:	1C - Lead-Contaminated Soils	Expected Accuracy Range:	+50% to -30% (feasibility study)
Description:	Cover	Present Worth Discount Rate:	7%
Site ID:	UPRR - Omaha Shops	Base Year of Estimate:	1999
Location:	Omaha, NE	Capital Cost Years:	0
Date Prepared:	December 22, 1999	O&M Cost Years:	1-15

YEAR	CAPITAL COST	ANNUAL O&M COST	TOTAL COST	DISCOUNT FACTOR (7%)	PRESENT WORTH	CUMULATIVE O&M PRESENT WORTH
0	$1,017,856		$1,017,856	1.000	$1,017,856	
1		$15,525	$15,525	0.952	$14,786	$14,786
2		$15,525	$15,525	0.907	$14,082	$28,867
3		$15,525	$15,525	0.864	$13,411	$42,278
4		$15,525	$15,525	0.823	$12,772	$55,051
5		$15,525	$15,525	0.784	$12,164	$67,215
6		$15,525	$15,525	0.746	$11,585	$78,800
7		$15,525	$15,525	0.711	$11,033	$89,833
8		$15,525	$15,525	0.677	$10,508	$100,341
9		$15,525	$15,525	0.645	$10,008	$110,349
10		$15,525	$15,525	0.614	$9,531	$119,880
11		$15,525	$15,525	0.585	$9,077	$128,957
12		$15,525	$15,525	0.557	$8,645	$137,602
13		$15,525	$15,525	0.530	$8,233	$145,835
14		$15,525	$15,525	0.505	$7,841	$153,676
15		$15,525	$15,525	0.481	$7,468	$161,144
TOTALS	$1,017,856	$232,875	$1,250,731		$1,179,000	

TOTAL PRESENT WORTH COST **$1,179,000**